

AUTOMOTIVE INDUSTRIES

The AUTOMOBILE

Vol. XLV
Number 15

PUBLISHED WEEKLY AT 239 WEST 39th STREET
NEW YORK, OCTOBER 13, 1921

Thirty-five cents a copy
Three dollars a year

ATWATER KENT

Ignition, Starting and Lighting

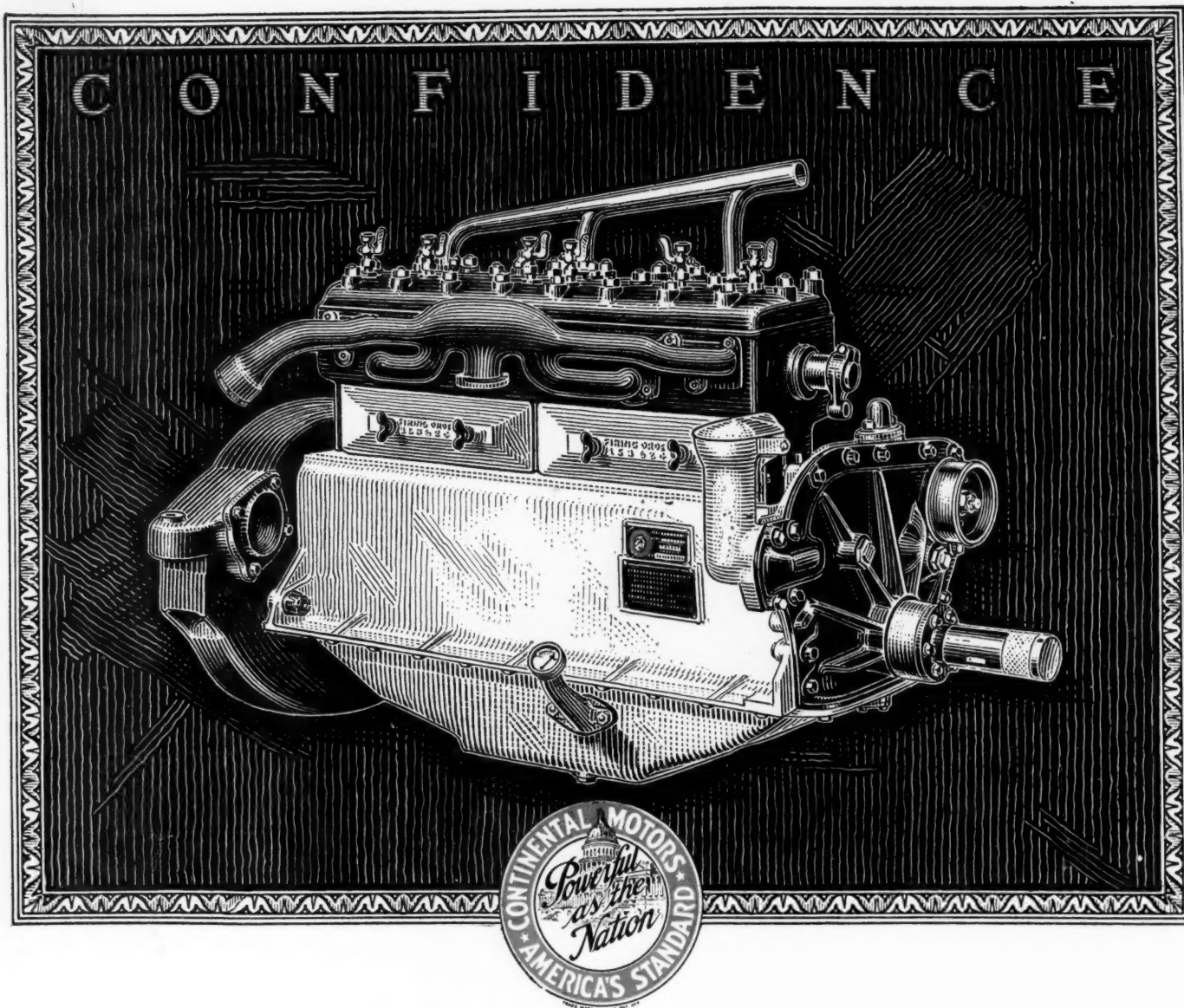
STANDARD equipment on many of America's best cars—selected for its uniform excellence of manufacture and unvarying performance.

These manufacturers realize the vital importance of efficient ignition and have made their selection on the basis of merit rather than price.

Hundreds of electrical service stations, thousands of automobile accessory dealers and garages are ready to furnish you with ATWATER KENT products and service.

ATWATER KENT MFG. COMPANY

Philadelphia



Continental achievements in the past have earned the whole-hearted CONFIDENCE of the motor using public. And, in a like manner, Continental co-operation in transportation undertakings has resulted in the complete CONFIDENCE of the automotive industry. ¶ This broadcast CONFIDENCE is gratifying, but it is not accepted by the Continental organization as a mere reward granted for past performances. It is accepted rather as a well defined obli-

gation to strive for even greater achievements in the future. ¶ It is to be expected, therefore, that the product whose manufacture is characterized by such a spirit, will operate with unique precision—precision that unavoidably creates the impression that the motor, itself, possesses CONFIDENCE in its own ability—precision that is bound to enhance universal respect for that well known symbol of excellence—the Continental Red Seal.

CONTINENTAL MOTORS CORPORATION

Offices: Detroit, U. S. A.

Factories: Detroit and Muskegon

Largest Exclusive Motor Manufacturers in the World

Continental Motors

STANDARD POWER FOR AUTOMOBILES, TRUCKS AND TRACTORS

AUTOMOTIVE INDUSTRIES

The AUTOMOBILE

VOL. XLV.

NEW YORK—THURSDAY, OCTOBER 13, 1921

No. 15

Trend to Light Cars and Fuel Economy in Paris Show

Engineering efforts to give greater economy of operation are in evidence, but price reductions are few. 4-cylinder models predominate to a greater extent. Three-speed transmissions extensively used on more powerful cars. Only two English cars shown.

By W. F. Bradley

PARIS, Oct. 8.

THE Paris automobile show, the second held since the Armistice, was officially opened to the public by the Minister of Public Works in the Grand Palais, on Wednesday last, with a record number of exhibitors representative of the entire French automobile and accessory industries. The names of 830 exhibitors are given in the list and of these about 80 per cent are French. Owing to the great demand for space, it was necessary to erect a special building for trucks and tractors. Only two English cars were shown. The American industry is represented by the Pierce-Arrow, Cadillac, Standard and Buick. Practically all of the Italian makers are showing their products.

These figures indicate that the Paris show, like the Berlin show, was largely national in character. No attempt at the exclusion of foreign cars was made, of course, as in the case of the German show, except that German manufacturers were prohibited from exhibiting. The small number of British exhibitors indicates that the Britons will be content with concentrating their efforts on the Olympia show. Thus the Italians are the only foreign makers to exhibit as a body. This is probably due to the very poor

home market which has faced the Italian makers during the last few years.

French manufacturers insist that the present high taxes on gasoline are a large factor in retarding the trade. These taxes, together with the high import duties which France has placed upon foreign cars, are doubtless responsible to a large extent for the decline in the international flavor of the Paris salon. The American makers have evinced considerable interest in the show, nevertheless, since they outnumber the British exhibitors, despite the fact that they have extremely unfavorable exchange conditions in addition to the other difficulties presented.

French manufacturers are hopeful that the show will mark the end of the industrial depression. It is believed in some quarters that the wish is largely father to the thought so far as this is concerned. The past 18 months have been so disastrous that even the most optimistic are merely hopeful rather than assured. The factors underlying the depression are such, however, as to indicate that the show itself can have little more than a helpful influence on the condition of the industry. As noted previously, the manufacturers believe the high gasoline taxes to be responsible for a large measure of sales resistance,

while other factors of similar nature have served to make marketing difficult.

There is a definite feeling, however, among those closely in touch with the situation that a real buying campaign may set in following the salon. This feeling is based upon an observation of the visitors to the show and of the live interest which has been shown in many of the exhibits. Aside from the hindrances to selling mentioned, there has been something of a general disinclination to buy, similar to that experienced in the United States. The interest stimulated by the salon is expected to have a very favorable effect in overcoming this attitude, and there are already some indications, after the first few days of the show, that these expectations will be fulfilled to some extent.

French manufacturers are hopeful that the show will mark the end of the industrial depression, but the past 18 months have been so disastrous that it is more a case of hopefulness than of assurance. The impression prevails, however, that, after the first few days of the show a real buying campaign will set in. Manufacturers insist that if the government would remove the present high taxes on gasoline a great impetus would be given to trade.

In a technical way, much effort has been made by the French industry to attract buyers. In view of the fact that the public desires greater economy of operation, practically all makers are producing smaller and lighter designs. The dominating type at the show is a light, 4-passenger, 4-cylinder car of 120 cu. in. piston displacement or less, with a nominal rating of 10 horsepower. Some of the firms which have always been catering to the high-class trade and never previously have built cars of this type, have entered this class. Panhard, for instance, offers a 4-cylinder Knight engined car of 60 x 105 mm. cylinder dimensions (2.36 x 4.13 in.). Voisin also shows a 4-cylinder Knight engined car of 60 x 110 mm. cylinder dimensions (2.36 x 4.33). Darracq, Delage, Delaunay-Belleville, Delahaye and Chenard-Walcker are other firms building smaller cars than they have ever turned out before. Citroen, while continuing his present model, has placed on the market a 5-hp. 2-seater with a 4-cylinder 55 x 90 mm (2.16 x 3.54 in.) engine, which sells complete for 8500 francs (\$653 on the basis of the current rate of exchange). For the manufacture of this car Voisin has secured control of the Clement-Bayard factory.

Very few reductions in price have been announced, the makers declaring that rock bottom figures have been reached, and it is believed that competition is causing some of the smaller makers to sell below manufacturing cost. The price of the Citroen 4-seater is now 13,900 francs (\$1,000).

Talbot-Darracq has put out a 12-hp. 5-passenger car at 22,000 francs (\$1,585), this being one of the cheapest 6-cylinder models shown. The Lorraine-Dietrich 6-passenger sells at 28,750 francs (\$2,075). Fiat has reduced the price on the 10-hp. 4-passenger model to 21,500 francs (\$1,550).

Four-cylinder models are in a greater majority than at any time in recent years and are followed by the 6-cylinders. Only two 12-cylinder models are being exhibited, a luxury type Voisin 12 with an all-aluminum

engine of the Knight sleeve-valve type and a Fiat 12 with overhead valves and the camshaft in the crank chamber. Lancia, another Italian maker, is showing an 8-cylinder chassis which has the peculiarity that the two cylinder blocks of the V-engine make an angle of only 14 deg. with each other. Bugatti, who claims to have been the first to have turned out an 8-cylinder in-line engine, of 3 litres (183 cu. in.) piston displacement, is showing a sport model of this type. Panhard is showing a new 8-cylinder in-line Knight-engined car and Fonck also shows an 8-cylinder in-line model. No other multi-cylinder engines have made their appearance. Ballot is marketing duplicates of his 2 litre (122 cu. in.) racing jobs with sport bodies.

The most outstanding feature of the show is the use of front wheel brakes by 35 different firms, 23 of which are working under Perrot license. Bugatti, Rolland-Pilain and Voisin are using hydraulically operated brakes, while on the Slim car compressed air is used for applying the front brakes. Among the important firms which have recently adopted front-wheel brakes may be mentioned Panhard, Fiat, Hotchkiss, Rochet-Schneider and Farman. There are several instances in which front brakes are fitted to chassis with a rating of 15 hp.

or less, and buyers in a great many cases now insist on these brakes. Servo brakes, by which is meant brakes which are operated by other than muscular energy, are used on several cars, including the Ballot, Panhard, Bignan and Chenard-Walcker. The Mallot servo brake, with which it is impossible to lock the wheels, is used by Chenard-Walcker and Bignan. There is a slight increase in the proportion of overhead valve engines, the overhead valve design being used particularly

in conjunction with detachable cylinder heads. Most of the overhead valves are operated by pushrods. The great majority of the entirely new models are fitted with Delco electric equipment, but none of the modified or remodelled cars take this equipment.

Three-speed transmissions are coming into more extensive use on the more powerful cars, while the majority of the cheaper and smaller models retain the four-speed gearbox. A great deal of development work seems to have been done on springs. Only three firms—Berliet, Lorraine-Dietrich and Bellanger—are adhering to the American type of car with large engine and of cheap production, whereas all of the other makers are turning out the European type of cheaper car with the smallest possible engine.

FIGURES made public by the Controller General of Civil Aviation in Great Britain show that from May, 1919, to March, 1921, 63,975 civilian airplane flights were made in the United Kingdom, averaging 19 minutes per flight. The planes flew a total of 1,593,700 miles in the 23 months.

More than 170 tons of freight and 110,388 passengers were carried.

Goods imported by airplanes during that period totalled in value 818,553 pounds sterling and exports aggregated 402,776 pounds.

In France civilian airlines imported 2,041,400 francs worth of goods during the first quarter of this year. Exports by air amounted to 660,200 francs.

THE exceptional interest shown by the public in the Paris show has made French manufacturers hopeful that the worst of their depression is past. The high gasoline taxes, which continue to hinder sales, are reflected in the engineering trends at the show. The dominating type is a light 4-passenger, 4-cylinder car of 120 cu. in. piston displacement or less. The French automotive engineers have made definite efforts to attract buyers through designs which make for fuel economy.

New German Car Has Novel Design Features

The clutch design of this 30 hp. Protos is entirely new. The method of locking the gears in position is unusual. Cylinder block is an excellent example of German engineering and foundry practice. There are no control hand levers on steering wheel. Four-cylinder engine used.

By Benno R. Dierfeld

THE large Siemens electrical manufacturing company in Siemensstadt, near Berlin, about seventeen years ago established a branch factory for the manufacture of automobiles. Its line of cars have been sold under the trade name of Protos and have enjoyed a wide market. A number of the chief components of the latest 30-hp. Protos model are illustrated herewith. The car is fitted with a four-cylinder 80 x 130 mm. (3:15 x 5.12 in.) engine.

The four L-head cylinders of the engine are cast in a block, with the heads integral. The crankcase is divided horizontally. Cooling is by thermosyphon circulation, ample water spaces being provided. The aluminum fan is driven by a fabric belt. The crankshaft is carried in three babbitt bearings in the upper half of the crankcase. The pistons are of cast iron with three rings, and the piston pins are fixed in the piston bosses. The valves have adjustable tappets and are enclosed by large aluminum cover plates. The camshaft is driven by an enclosed, silent chain which also drives the high tension magneto. The latter is a special enclosed type built by the Siemens concern, and is located at the right hand side.

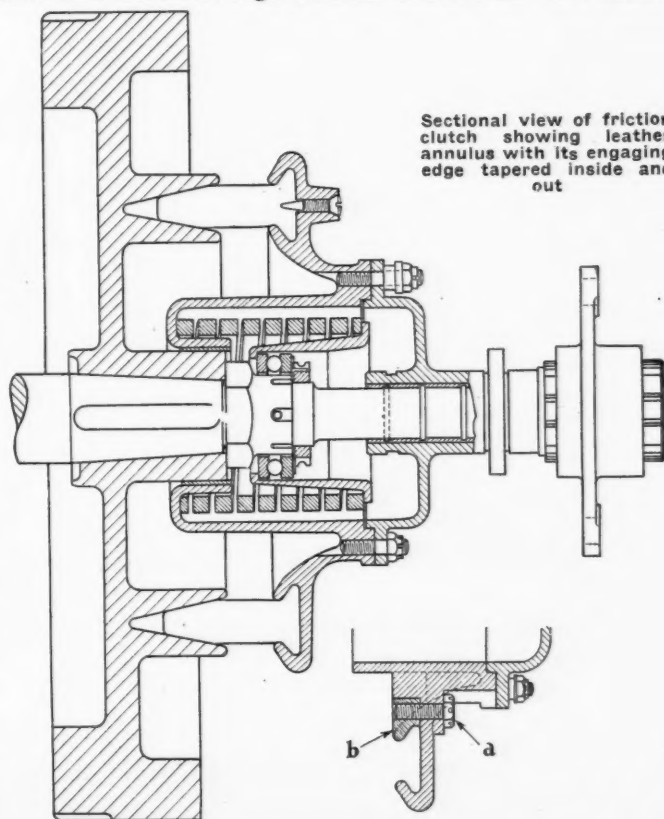
An electric generator is arranged on the right hand side and driven by a fabric belt from the front pulley; between the crankcase arms extend cast aluminum filler plates or continuous webs which form bases for the magneto and generator and replace the usual noisy sheet steel underpan. The Zenith carbureter is located on the left hand side, the mixture passing from it through a cored hole in the cylinder block. Lubrication is by a circulating system with gear pump. One of the illustrations shows different sections of the cylinder block. This is a very fine example of German engineering and foundry practice. The arrangement of the internal gas passages and the ample water space can be clearly seen from these drawings.

The flywheel is made from a forging, the objects being to obviate all danger of bursting and to eliminate or at least minimize the rejections which are said to be numerous with cast flywheels; its rim has the usual gear ring for the electric starter.

The clutch is an entirely new design. The flywheel is formed with an annular Vee groove that forms the female double cone. The male double cone consists of a number of suitably cut leather disks, which are held to the aluminum clutch plate with a dovetail joint and are further secured by screws. This leather double cone with the clutch plate is pressed against the flywheel by means of the usual coiled clutch spring. When the clutch is en-

gaged there is no axial thrust on the main bearings of the crankshaft. Declutching is effected by means of a divided coupling sleeve on the hollow clutchshaft. In order to remove the leather disks, screw *a* in the clutch plate is loosened, after which the filling piece *b* in the dovetailed groove may be removed and the screws loosened. The coupling sleeve is lubricated by means of a snap lid oil cup. The transmission has four forward speeds and reverse and several sections of it are shown. There are three shifter bars with the usual forks engaging into slots on the gear hubs.

Quite interesting is the manner of locking the gears in position. For this purpose the shifting lever shaft is provided with a lever *A*, having two arms *A₁* and *A₂*. The lower end of arm *A₂* engages between the two lugs on the upper side of the shifter bars and the lower end of arm *A₁* carries the sickle-shaped piece *S*. Furthermore, there is arranged transversely to the shift bars a locking bar *B*, with two milled notches *D* and *E*. The shifter bars also have two lugs on their under side. The sickle-



Sectional view of friction clutch showing leather annulus with its engaging edge tapered inside and out

The Protos has never been sold in this country but became somewhat known here through its participation in the New York-Paris race in 1908. It arrived in Paris first but was disqualified because of having used the railroads in the western part of the United States, and a Thomas car was declared the winner.—EDITOR.

shaped piece *S* of the gear shift lever engages in the notch *D*, where a guide roller *R*₁ for the straight side of *S* and a spring loaded roller *R*₂ for the curved back side of *S* are provided.

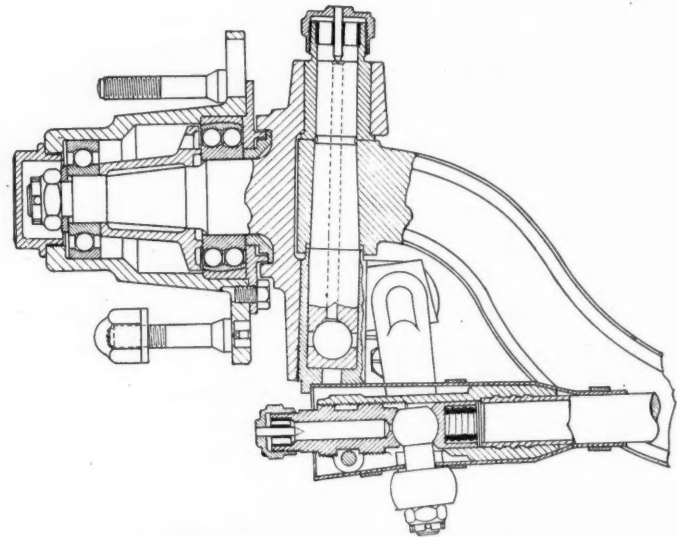
As soon as the gear shift lever is moved axially, piece *B* is moved axially too, because the sickle *S* engages in notch *D*, and its milled notch *E* opens the way for the middle gearshift bar, while the other two shifter bars are locked by piece *B*, engaging their lugs on the under side. Now the shifter lever can be swung sideways and the desired gear engaged. Finally, the spring-loaded roller engages the corresponding notch on the back side of the sickle *S* and locks the gear in position.

When any forward gear is engaged the two reversing gears are at rest, thus consuming no power.

All transmission shafts run in ball bearings; the transmission case has a cover with which the gearshift gate is cast integral, thus facilitating the mounting of the transmission in the chassis. Lubrication of the transmission is entirely with oil, the supply is replenished through a snap cover filler *O* so arranged that the oil level in the transmission case is limited as to height, thus avoiding oil waste or power loss due to too high an oil level. The oil cup on the upper part of the transmission case serves to lubricate the universal joint.

The brake at the rear of the transmission is operated by pedal, shaft and toggle; its shoes are lined with cast iron. Adjustment can be effected at the pedal and by a small hand wheel on the brake itself.

The combined universal and slip joint runs in oil and its case encloses the pulley of the speedometer drive. The drive shaft runs in ball bearings in the torsion tube; the front bearings are lubricated by an oil tube from the

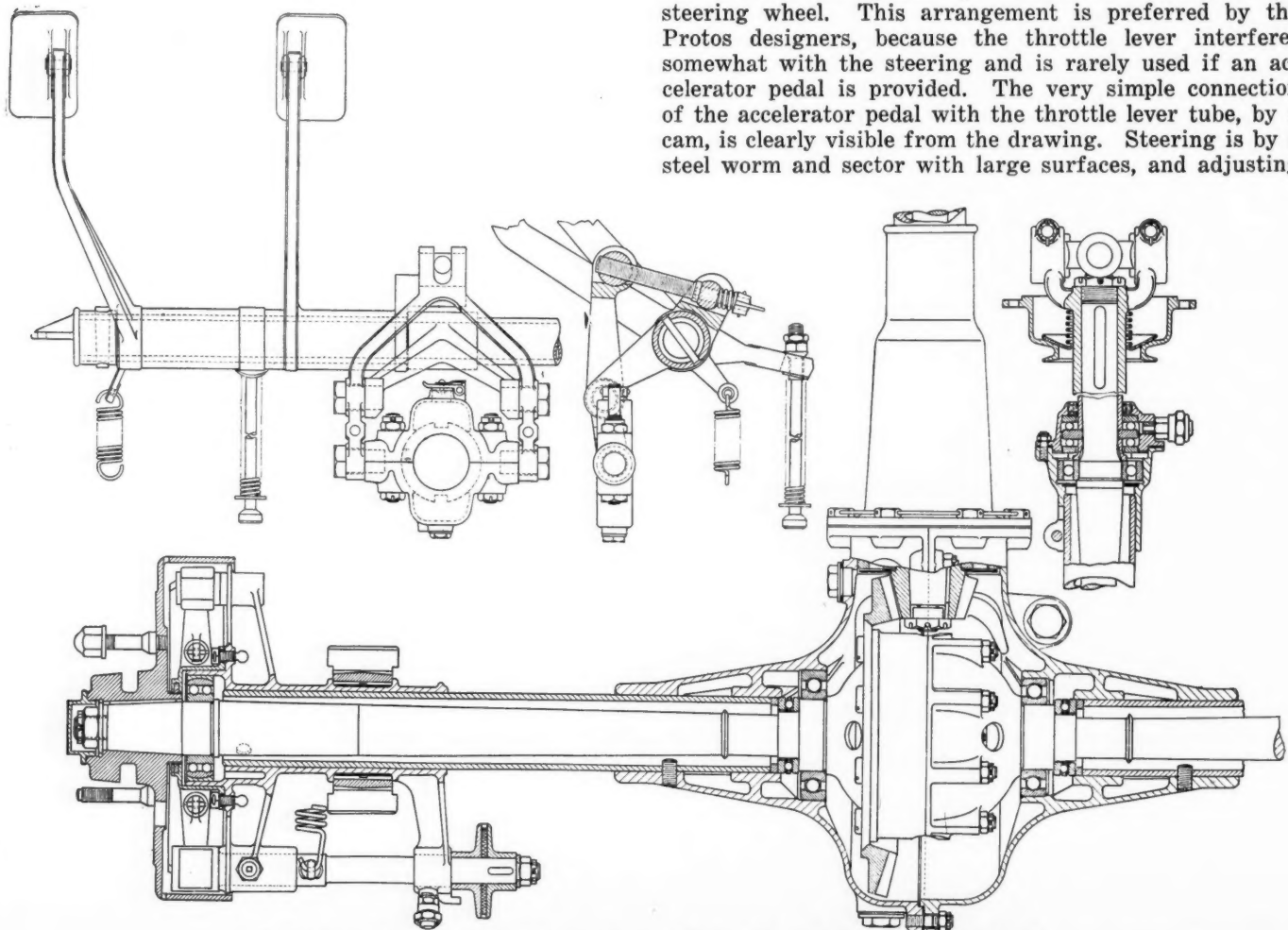


Front axle end, knuckle and inner hub

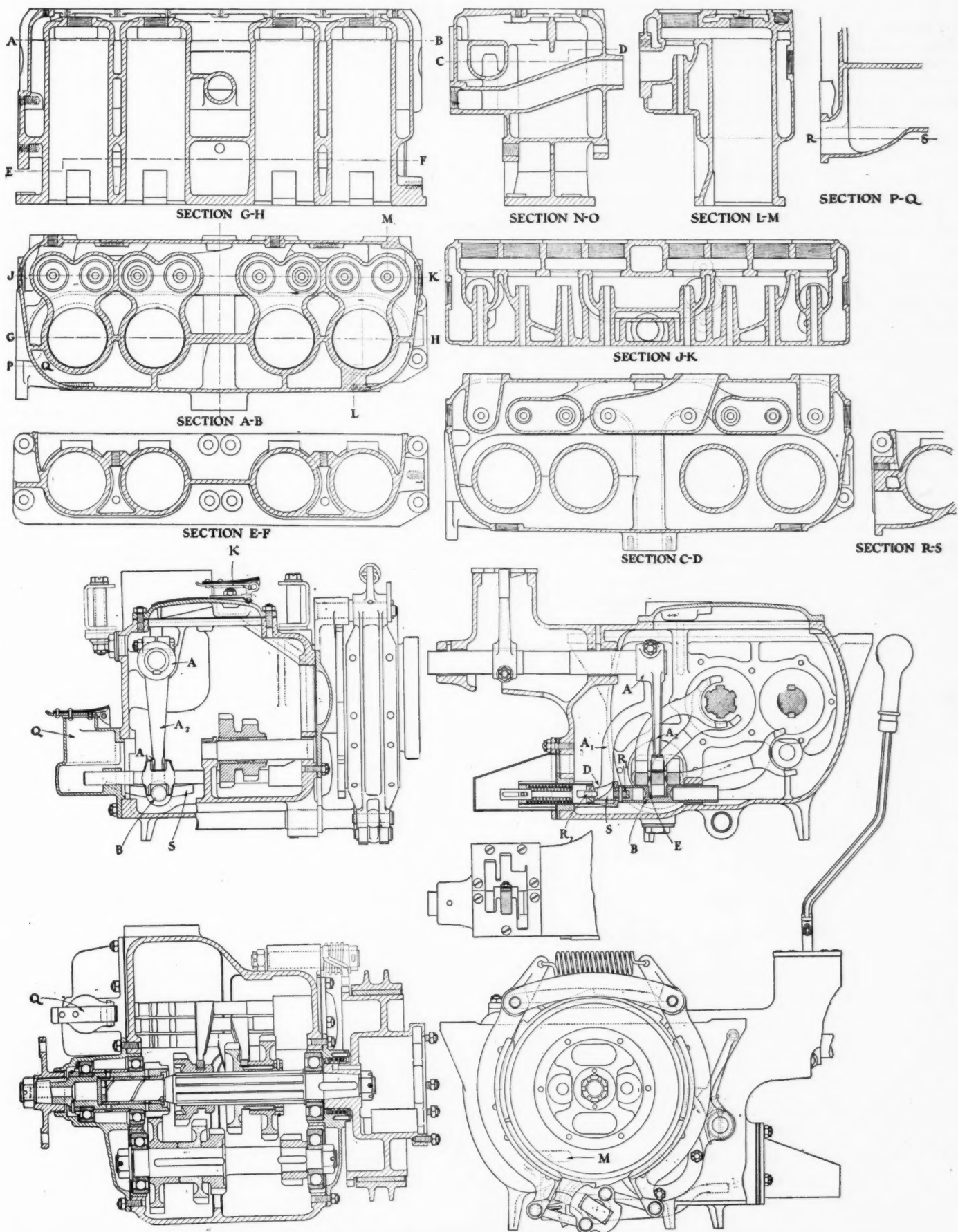
transmission case. The rear axle housing is of cast steel with pressed-in steel axle tubes; the bevel pinion shaft runs in one large and one small ball bearing, the thrust being taken near the universal joint.

The rear-axle is semi-floating. The steel wheels are fitted to a conical hub and can easily be removed with a special spanner. The rear brakes are expanding brakes and can be adjusted by means of a fluted disk.

There are no control hand levers on the steering wheel, for the magneto has automatic spark advance and the throttle lever is replaced by a rotatable sleeve below the steering wheel. This arrangement is preferred by the Protos designers, because the throttle lever interferes somewhat with the steering and is rarely used if an accelerator pedal is provided. The very simple connection of the accelerator pedal with the throttle lever tube, by a cam, is clearly visible from the drawing. Steering is by a steel worm and sector with large surfaces, and adjusting



Pedal assembly and sectional views of rear axle and forward end of propeller shaft



Above: Sectional views and details of cylinder block. Below: Views of the gearbox, control and service brake

means are considered superfluous. The sector forms one piece with the steering arm, thus increasing the security.

The front axle is of the Mercedes type. The ball heads of the steering knuckle arms are below the tie rod, so the latter could not drop to the road if it should become detached. The ends of the tie rod tube are rolled into the annular grooves of the fittings. This is claimed to result

in a very dependable joint, avoiding the danger of burning the metal in brazing. Within the wheel hub there is a small ball bearing at the outer end and a large double row ball bearing at the inner end. The steering knuckle pivot has plain bronze bushings, with a large steel ball taking the axial thrust. Front and rear steel wheels can be exchanged.

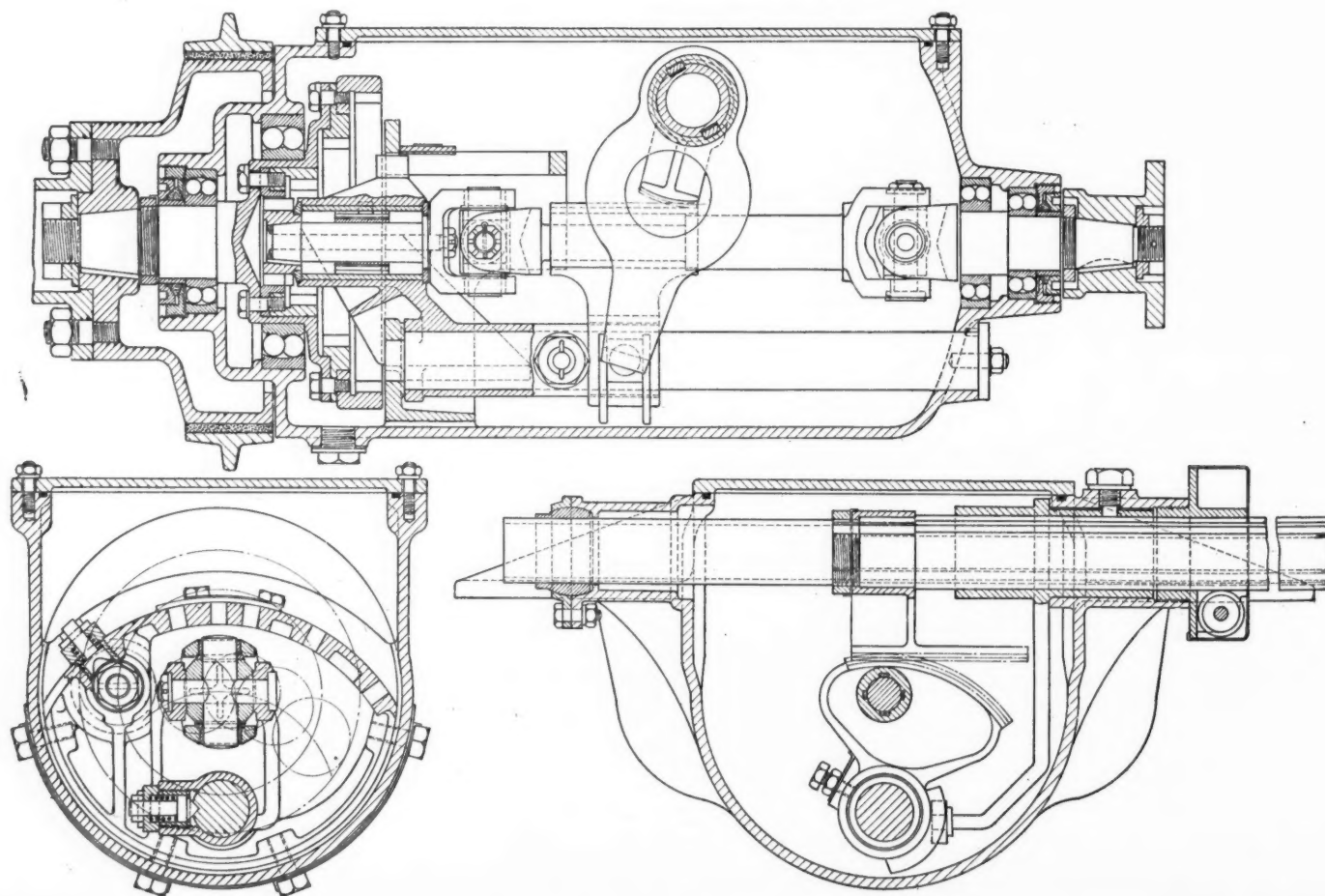
A New Gear Box of Swedish Origin

A MOTOR car change gear has been invented by L. A. Pettersson, a Swedish engineer, a representative of whom is now in this country. The chief feature of the new gear is that for all forward speeds the power passes through the gearbox in a straight line, from the first motion shaft to the tailshaft arranged co-axially therewith, so that the usual secondary or countershaft is eliminated. The transmission shown herewith is designed to afford four forward speeds and one reverse, including a direct drive. The gearing itself is exceedingly compact, and that the complete gearbox is of about the same size as the conventional box is due to the fact that it also encloses an intermediate shaft with two universal joints, which permits of giving the single driving pinion, when changing from one speed to another, a radial as well as an axial motion. The gear is known as the Centrali.

As will be seen from the illustrations, the primary shaft consists of three parts. The first part is mounted in the outboard bearing at the clutch end and connects to the clutch shaft or sleeve. The second or intermediate part connects the two universal joints and incorporates a sliding joint. The third part, which carries the single driv-

ing pinion, is mounted in a bracket swiveled around a pivot in the lower part of the case. By moving the bracket axis different distances from the outboard bearing axis the pinion and its shaft can be slid into mesh with one or the other of four concentric internal gears all secured to the driven shaft. Operation of the gear is effected by a single lever at the side of the case which has both a sliding and a rocking motion. The sliding bearing supporting the driven pinion is first rocked into the position corresponding to any particular gear and is then shifted into mesh lengthwise. When in mesh the bearing bracket is held against lateral strains by a locking key which enters a slot in a sector plate, and it is held against longitudinal strains by the usual spring-pressed plunger. The reversing pinion rotates only while actually in use, and when not in use disappears in a recess.

A number of advantages are claimed for this change gear, the principal one being silent operation. All bearings are of the anti-friction type. As compared with the conventional type the gears are fewer in number but larger in size, since the total reduction is made in one step instead of two.



Primary shaft showing three parts

Unconventional Sporting Airplane a New French Product

Unusual four-cylinder engine in airplane of original design. Duralumin combined with ordinary wood and fabric in construction of frame. Manufacturer also produces larger planes for passenger carrying.

By John Jay Ide

THE aviation firm of Henry Potez came into existence during the war, when it constructed a considerable number of airplanes to the designs of other makers. After the war Henry Potez undertook the production of airplanes of his own design, the most unconventional of which is known as Type VIII. This machine is of the so-called sporting type and is fitted with a most unusual 4-cylinder engine, also designed by Henry Potez and described below.

In the Type VIII Henry Potez biplane duralumin is employed for the channel section wing spars, wing ribs and the framework of the fixed and movable portions of the tail. The longerons and struts of the fuselage are also of duralumin, while the fuselage covering is of plywood. It remains to be seen whether this compromise between all-metal and the ordinary wood and fabric construction has pronounced advantages.

The landing carriage has four wheels and, due to the low position of the fuselage, the struts connecting the axles with the fuselage are commendably short. A sprag brake, pivoted to the center of the rear axle and operated from the pilot's seat, reduces rolling after a landing has been accomplished. The machine can be landed at only 25 miles per hour, owing to the low wing loading—4.5 lb. per square foot.

The pilot is placed in the rear seat, and, as the passenger is placed at the center of gravity, the machine can be flown in his absence without compensating ballast. Double control is provided.

The specifications of the Type VIII Henry Potez are:

Span (upper plane)	26.2 ft.
Span (lower plane)	22.3 ft.
Total length	18.4 ft.
Length of fuselage	15.4 ft.
Total height	8.0 ft.
Wing area	205 sq. ft.
Wing chord	4.6 ft.
Wing gap	4.8 ft.
Aileron area	19.9 sq. ft.



The Henry Potez type S. E. A. VII passenger carrying biplane

Stabilizer area	15.6 sq. ft.
Stabilizer span	7.9 ft.
Elevator area	10.2 sq. ft.
Rudder area	4.8 sq. ft.
Fin area	7.0 sq. ft.
Weight empty	485 lb.
Live load	353 lb.
Fuel and oil for three hours	88 lb.
Total weight	926 lb.
Weight per sq. ft.	4.5 lb.
Weight per hp.	18.5 lb.
Factor of safety	7
Speed at ground level	75 m.p.h.
Climb to 6560 ft.	18 minutes



Type VIII Henry Potez biplane

Novel Engine Has Vertical Crankshaft

The Type VIII model is equipped with a Henry Potez Type A-4, 50-hp. engine. There are four air-cooled cylinders in line with a vertical crankshaft. The heads face forward in order to insure adequate cooling. The propeller is driven through a bevel gear at the top of the crankshaft. This bevel gear also acts as a 2-to-1 reduction gear. Pressure lubrication is employed.

The special feature of this engine is that light weight has been sacrificed in order to obtain the strength of an automobile type of engine. The weight complete is 4.4 lb. per horsepower, a figure about double that of a number of aviation engines.

Specifications:

No. of cylinders	4
Bore	3.93 in.
Stroke	4.72 in.
R.p.m. of crankshaft ...	2200
R.p.m. of propeller	1100
Hp.	50
Weight complete	220 lb.
Weight/hp.	4.4 lb.
Fuel consumption	4-gal. per hr.

For transport purposes Henry Potez supplies the Type S. E. A. VII. This machine is derived from the S. E. A.

IV C-2 military model, supplied in considerable numbers to the French army. The wing area, however, has been somewhat increased in order to improve the landing qualities. The design and construction are conventional. The pilot is placed aft of the 400-hp., 12-cylinder Lorraine-Dietrich engine and behind him is the nicely stream-lined cabin for two passengers.

This type of machine is being employed with success on the Paris-Prague and Paris-Warsaw commercial airplane lines.

The Type S. E. A. VII has the following specifications:

Wing area	474 sq. ft.
Span	45.9 ft.
Height	10.5 ft.
Length	30.2 ft.
Weight empty	2425 lb.
Personnel and luggage	661 lb.
Fuel and oil	551 lb.
Total weight	3637 lb.
Speed at ground level	120 m.p.h.

A Five-Speed Truck Transmission with Single Lever Control

SINCE pneumatic tires have come to be used extensively on trucks of moderate and larger capacities there has been need for transmissions with more than four speed changes. A number of such transmissions have been brought out. Most of these comprise a four-speed transmission with an extra two-speed gear connected in series therewith, so that any of the four forward speeds of the first gear can be combined with either the direct drive or the low speed of the second gear. While what is here described as two separate gears is generally enclosed in a single housing and forms a unit, two levers are required for operating the combination, which is something of an objection, even though one of the levers may not have to be operated very frequently.

A design of gear box for motor trucks giving five forward speeds and one reverse has been invented by A. G. Herreshoff and is illustrated by the accompanying drawings. It embodies many of the characteristics of the ordinary four-speed gear, and the third, fourth and fifth speeds are obtained in exactly the same way as the second, third and fourth speeds in a four-speed gear. One difference is that the constant mesh gears at the left hand end in the drawing are placed between two sets of ball bearings, the object being to limit the span between supports of the splined and secondary shafts.

Another difference is that the first and second speeds, instead of being obtained by double reductions, as usual, are obtained by triple reductions. It will be noticed that the pinions A and B on the secondary shaft are not fast upon that shaft like the rest of the pinions, but are free to revolve thereon on a roller bearing. These pinions are driven from the reverse gear shaft at a speed lower than that of the secondary shaft. The drive is from the reversing pinion C to the reversing gear D, from gear E to gear B and from gear B to gear F for the first speed or from gear A to gear G for the second speed.

The slider bars are arranged exactly as in a four-speed gear, there being three of these bars, each controlling a single gear on the splined shaft. In ordinary operation the truck would be started off on second gear and the first gear would be used only in emergencies. As the quadrant positions for the first gear forward and the reverse are opposite each other and this slot of the quadrant can be locked by means of a projection, operation of the gear is very simple. Moreover, maneuvering, which should be done on the first forward gear and the reverse, can be effected easily by simply moving the gear lever back and forth in the same

slot. Mr. Herreshoff maintains that the low gear reduction in the gear box should be about 9 to 1 in order that, on the one hand, the truck may be capable of running 15 m.p.h. at 1000 r.p.m. of the engine, and, on the other, there may be sufficient torque on low gear to slip the wheels. Such a high ratio of reduction is impractical with a double reduction in the gear box. Moreover, with only four steps in the gear box the individual steps would be so great as to make gear changing very difficult.

Some Observations Regarding Aircraft Engines

IN an article on the New Aircraft Engines Commander Martinot-Lagarde of the French Army makes the following observations regarding various features of engine design:

In the case of cylinders with aluminum water jacket, a defect in the fit of the steel sleeve in the cylinder block entails the early scrapping of the whole assembly.

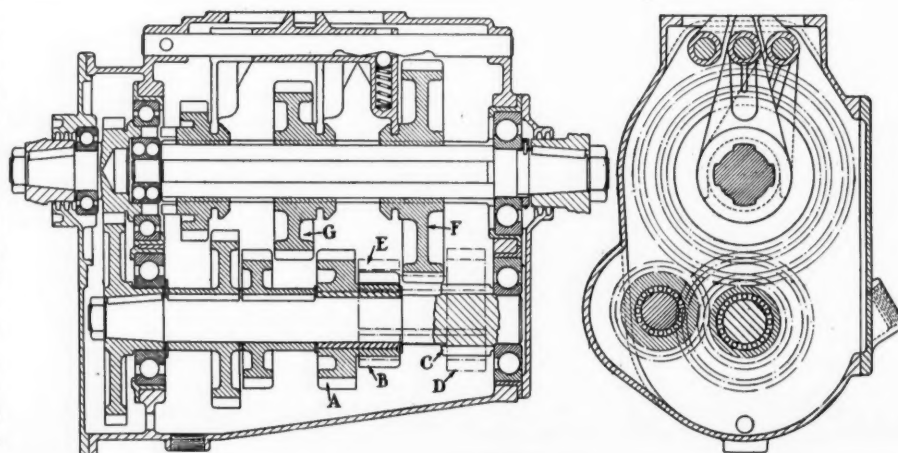
In engines on which the valves are completely enclosed the danger of coloring the valves by overheating is greater than in other engine types.

Valves with hollow, threaded stems are delicate. Where valves are operated by rocking levers the lubrication of the rollers presents a difficult problem.

Welding of the steel water jackets should be carried out with the greatest care, using very low carbon steel which does not air-harden.

Double valve springs are more dependable than single springs.

Water-tightness of the circulating pumps is more easily secured by means of gaskets than by means of conical joints.



Herreshoff gear box

Directional Control of Tractors

Weak points explained in steering by retarding one side or the other of the tractor. Double engine offers possibility for betterment as does the brake and clutch method for heavy loads. A variable speed transmission with infinite number of speeds would solve the problem.

By Victor L. Darnell

DIRECTIONAL control for tractors of the track-laying type or the four-wheel drive type, where steering is accomplished by retarding one side or the other, offers many perplexing problems. There are two distinct conditions under which the tractor must be steered or directed; under a heavy load and under a light load. Directional control is easier under heavy loads than under light loads, as far as making even turns is concerned. Under light loads the tractor tends to produce a jerky or zig-zag action. However, it is under a light load that sensitive directional control is most needed in farming operations, such as cultivating, mowing, etc. It is the purpose of this article to show how sensitive steering might be accomplished.

Several of the different methods that have been used are described below and their weak points are explained.

The Differential Method

The differential used with this method (Fig. 1) is exactly the same as that used in the automobile, but two brakes, C and D, are added. If the ground resistance is the same under both driving wheels, E and F, the tractor will continue in a straight line, but this is rarely the case and it is necessary for the operator to constantly tighten and loosen the brakes. Then, the use of brakes spells a waste of energy and as long as there is a slipping action under the brakes there is a loss of power; however, when the brake is locked and only one side turns, there is no loss except that in the differential gearing. The brake is applied on the side to which the tractor is to turn, and this involves one of the biggest draw-backs to this type of directional control. As one side slows up the speed of the other increases correspondingly until one side is locked and the other is go-

ing twice the original speed, which means that to keep the tractor going at a constant speed the engine must be slowed down to one-half its original speed and, roughly speaking, only one-half of the engine torque is carried to that wheel. This is one of the reasons that tractors of this type do not travel in a straight line, but follow a zig-zag course, especially under light loads.

Another bad feature is that the outside wheel should receive the maximum power in turning but is robbed of one-half that is coming to it. Then if one side gets in a mud hole the total turning effort is limited until a brake is applied on that side, and when this is done directional control is lost and the tractor must go whichever way it can until dry ground is reached, which may put the tractor in a still worse place. This could be partially remedied by locking the differential and driving straight ahead, but, of course, directional control would be sacrificed for the time being.

It would naturally come to one's mind that if the one side speeds up with a retarding of the other, why not put in a mechanism that would gradually neutralize this speeding up or, in other words, keep the engine speed constant or nearly so. In this manner conditions in turning would be bettered, but the other defects mentioned in the plain differential method would still be existent.

Fixed Ratio and Clutch Method

There is a clutch and change gear speed ratio for each side of the tractor, as shown, for this type of directional control.

By releasing a clutch the gear change could be accomplished. This could also be accomplished by replacing the gear change with another clutch of different speed

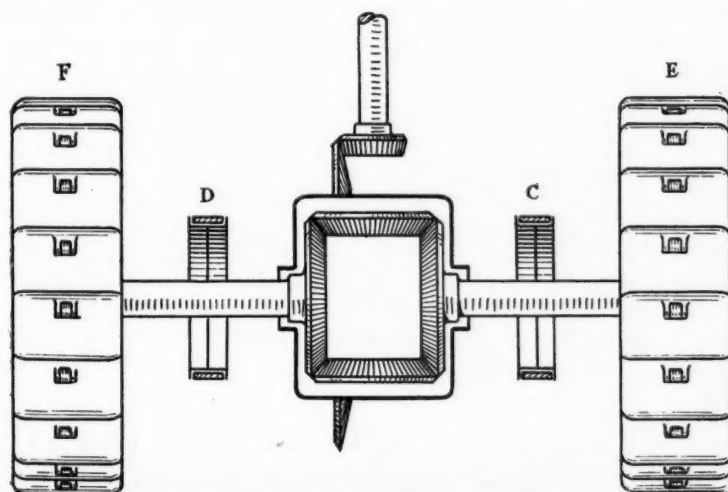


Fig. 1—The differential method

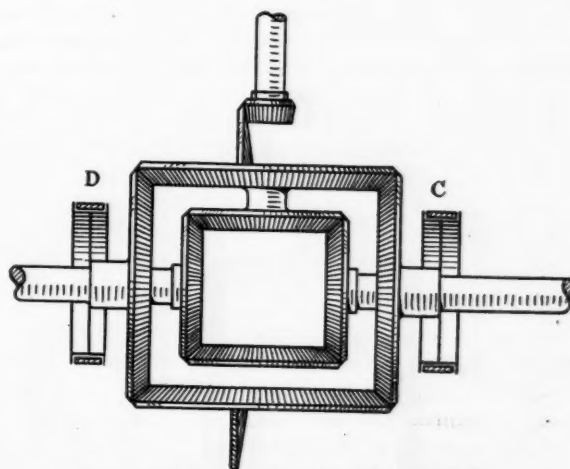


Fig. 2—Constant speed differential method

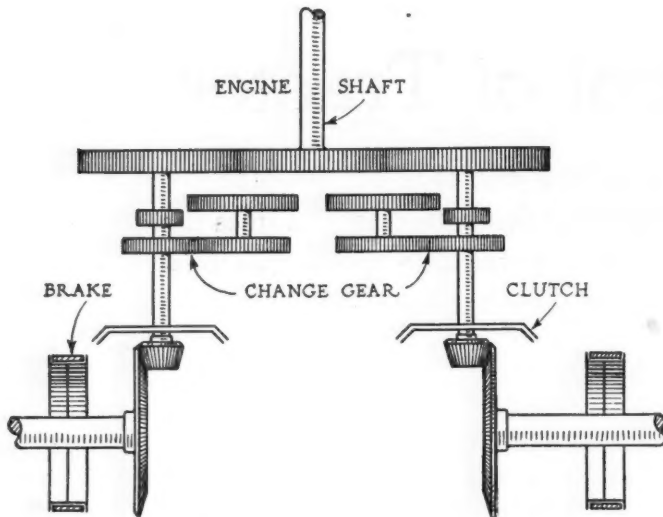


Fig. 3—Fixed ratio and clutch method

Fig. 5 (Right)—Indicating progressive action of brake and clutch

than the first one. If these clutches are capable of a slight degree of slippage then a curve would be turned with any desired radius and the power would be on the outside wheel in making the turns. If the steering is accomplished by the slipping clutch then the more evenly the clutch would slip under a heavy load, and hence the evenness of the turn. The more speed changes or the more clutches we had the more definite radii we could turn. The application of a brake would help directional control under light loads, and it might be necessary to lock the side in neutral with the brake when making a sharp turn.

The Brake and Clutch Method

If the clutch is sensitive enough, turning a large radius under heavy loads could be accomplished by means of the clutch alone and the use of the brake could be reserved for sharp turns, by releasing the clutch and applying the brake. For light load steering the clutch and brake action would have to overlap to prevent a zig-zag action of the tractor.

This can be explained by assuming the total movement of the clutch from open to closed to be divided into 10 parts and the movement of the brake the same. If the clutch was 10 points closed the brake would be one point on, and so on, until the clutch was entirely on and the brake entirely off, or vice versa. The checked area would represent a frictional loss and would occur only as the clutch was acting, there being no loss when the clutch was wholly engaged or disengaged. It would seem that at point 5, where the brake movement equals the clutch movement, there would be no movement of the tractor

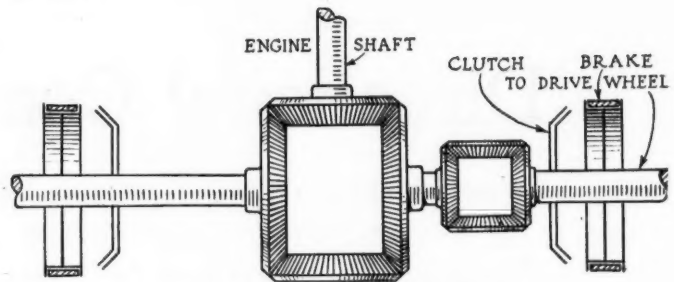
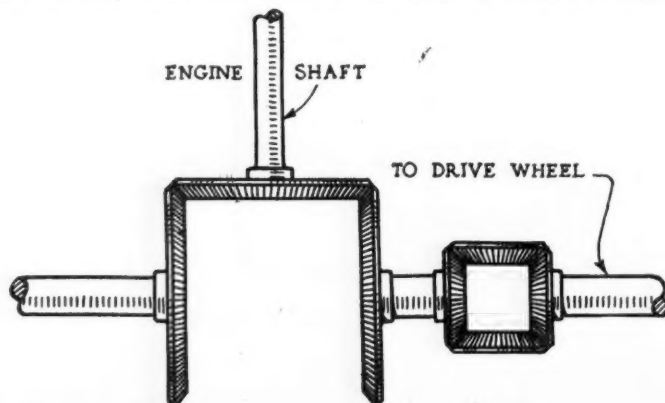
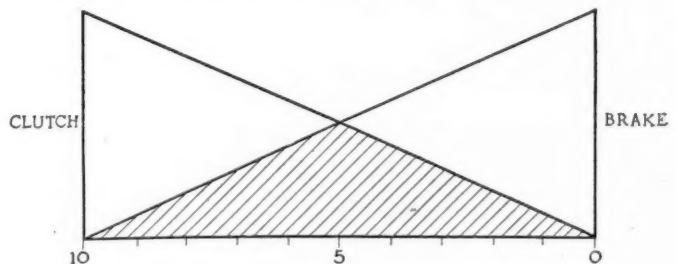


Fig. 4—Brake and clutch method



on that side, yet it would have a tendency to move forward. This can be explained by assuming one side of the tractor only connected to the motor. The tractor will then move in a straight line, provided there is no load on it due to its construction. There are then two alternatives, one being to apply a brake to the free running side and the other to add a load to the tractor to produce its easy turning.

There are several other methods of directional control which have possibilities.

The Friction Drive

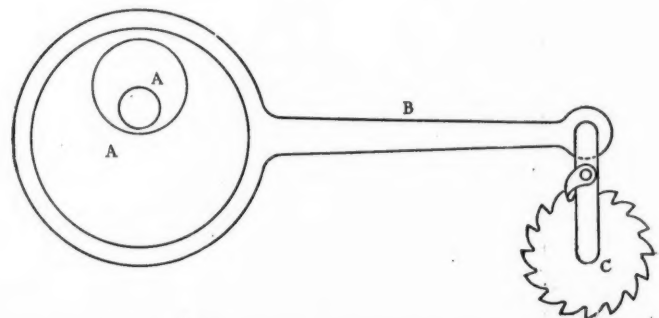
This friction drive could be made cheaply and sensitive enough for light work.

If a variable speed transmission could be devised with an infinite number of speeds and at the same time cheap to manufacture, durable and efficient, the problem would be practically solved. The magnetic transmission would accomplish the desired results, but would be too intricate and expensive. The hydraulic transmission would also answer the purpose, but its low efficiency, cost and number of parts required make it prohibitive.

The variable crank and ratchet looks very promising, but has never come to the front.

By simply moving the cam eccentric A around, the throw of the arm B is varied. By using three eccentrics the shaft C is given a fairly constant speed.

The steam tractor with an engine on each side would produce the best results that could be wished for. By simply operating a two-way valve the speed of either side could be controlled within the narrowest limits, and differentiation of power would be complete.

Fig. 7 (Above)—The variable crank and ratchet method
Fig. 6 (Left)—The friction drive method

Permanent Top Viewed with Favor in Many Quarters

Few manufacturers will displace collapsible top on their 1922 models but many believe the trend is in the direction of the permanent type. Heavy buying of enclosed cars indicates that the public no longer insists that the top be lowered. Considerable interest aroused by questionnaire.

THE permanent top as standard equipment for passenger cars will not become general on 1922 models, but a growing tendency on the part of the buying public to favor a change from the collapsible top has caused a majority of manufacturers to give serious thought to the question. Certain models of a few makes of cars will appear with the permanent top this season and several manufacturers will be prepared to furnish such a top on special orders.

The type of permanent top that has been seen the most is what is known as the California top. This has been extremely popular in far western states. Everyday observation proves that in most other sections of the country the average car owner seldom lowers his collapsible top. The enormous increase in the sale of sedans and coupés indicates that many buyers no longer care whether a top can be lowered or not. It was these tendencies on the part of the public that caused AUTOMOTIVE INDUSTRIES to conduct a survey, which has recently been completed, asking manufacturers whether or not they planned to use the permanent top as a part of their equipment on the 1922 models and whether or not they felt that the tendency of other manufacturers was toward such a move.

Replies to a questionnaire from 49 manufacturers, who produce more than 75 per cent of all cars manufactured in the United States, showed that of this number there are 11 who expect to use the permanent top as a part of their standard equipment on one or more models. Five more said they would be prepared to furnish the top on special orders. The California top will be used on 6 of the 11 makes of cars that will have it as a part of their equipment, while the others will use those of their own design. But one of the 5 who will supply the tops on special orders will use their own model, the others planning to use the California top.

The survey showed that a genuine interest was being taken by manufacturers in the issue and 33 of the 49 said they felt that the tendency among other manufacturers was toward planning for such equipment. Only five said they thought there was no general movement along this line and 11 were non-committal.

The principal objection to a permanent top is the increased cost of manufacturing. Several companies reported that they felt that there is an increasing tendency on the part of the public to desire the change, but increased production costs would demand increased selling costs and in lieu of the period of industrial depression that has been upon the country, economy is the most desirable factor to maintain so long as it can be done without impairing efficiency and quality. The question of shipping also comes into the discussion, for many cars are being shipped from the factories in double decked loads. With a permanent top this, of course, would be

impossible unless some means could be devised whereby the top could be shipped in parts and assembled when it reaches the dealer.

Arguments in favor of this type of top, however, appeared. Some of the principal reasons why manufacturers feel that the tendency is favorable are:

1. Public satisfaction.
2. Cheaper cost as compared to the sedan or coupe.
3. Appearance.

In order to discover whether or not the public particularly desires a top that can be let down it is only logical to determine whether or not there has been a heavier demand for closed cars in the past few years than before. Figures for 1919 show that 161,000 closed cars were sold to the public. In 1920 a total of 320,000 were sold. The closed cars in 1919 amounted to 10 per cent of the entire number produced and in 1920 to 17 per cent. Figures for 1921, of course, are not available, but indications point to the fact that even a larger number will be sold. It is almost certain that the total production in 1921 will not reach the figure attained in 1920 when 1,883,000 cars were produced. This is due to industrial depression, but at the same time the demand for coupe and sedans is already ahead of production on several models.

Although expense of production was given as one of the reasons some manufacturers do not look with favor upon the permanent top, others pointed out that it is cheaper than the enclosed car. It has been shown that there is an increased demand for enclosed cars, and it is logical to assume that if the public is willing to buy coupe and sedan models of cheaper cars then a model combining the advantages of both the open and closed car would not prove a drug on the market. Figures have been compiled showing that the public does buy the cheaper models of enclosed cars. Ten companies, manufacturing these models at prices ranging from \$695 to \$2,885, had much larger sales than did companies manufacturing sedans and coupes of a more expensive nature. And a study of price lists will prove that there is a difference of from \$245 to \$500 between the prices of open and enclosed models of these ten makes of cars.

As far as appearance is concerned, that is largely a matter of personal opinion. There can be no doubt that many graceful lines have been brought out in the standard collapsible top. The general trend of opinion, however, indicates that the manufacturer as well as the public is convinced that there is more beauty and style in the permanent top.

A broad view of the situation does not indicate any immediate revolutionary movement toward standardizing this type of top, but there does appear a growing tendency to look with favor upon such action.

The Testing of Motor Fuels

Part I

A brief manual outlining the need for the testing of motor fuels, and showing how the results of tests are interpreted, especially in relation to their effect upon the engine and its performance.

THERE is a wide variation in the quality of commercial gasolines and a wide and increasing distribution of blended fuels, particularly those containing benzol. This makes it essential that all gasoline used in engineering development or motor testing work be examined for its composition and properties. Accurate information on the quality and composition of gasoline used in such work is essential to the making of a proper decision as to whether the results obtained should be attributed to the engineering design or to the quality of the fuel used. Some of the factors which have a marked influence on the behavior of gasoline are:

- 1—Initial boiling point, because of its effect on starting.
- 2—Height of distillation curve and position of 85 per cent point, because of influence on such factors as distribution, knocking, carbonization and contamination of lubricating oil.
- 3—Content of alcohol and of aromatic hydrocarbons (benzol and similar materials), because of the smoothness and relative freedom from knock which characterizes the combustion of such materials.
- 4—Percentage of unsaturation, because of the gums which are formed from the unsaturated constituents, and which are then deposited in the induction system and on intake valves.

Fortunately, the commercial examination of gasoline is a comparatively simple matter and can be made by any technically trained man with a minimum of equipment.

If the gasoline is composed entirely of Eastern or Mid-continent petroleum oils, the determination of the following factors gives sufficient information on the characteristics of the material in practically any case to indicate whether it is suitable for use.

- 1—Specific gravity.
- 2—Distillation range.
- 3—Acidity.
- 4—Percentage of unsaturation.
- 5—Content of gummy materials.

In addition to methods for determining the above factors and for interpreting the results obtained, methods will also be given for obtaining the following data on a motor fuel:

- 6—Percentage content of aromatic hydrocarbons (benzol).
- 7—Purity of a fuel as to its content of paraffin hydrocarbons.

- 8—Content of alcohol.

INTERPRETATION OF RESULTS

1—Specific Gravity

The specific gravity of a gasoline is of importance only in that, when taken together with the distillation data, it serves to indicate the presence of any considerable percentage of materials other than those normally present in gasoline, such, for example, as benzol.

The normal specific gravity of commercial gasoline from Eastern or Mid-continent crude oils is around 0.740 to 0.745. Gasoline from California crude oil having approximately the same boiling range, has a specific gravity around 0.760.

The specific gravity of motor benzol is 0.877 to 0.879. The gravity of a gasoline-benzol blend is approximately the average of the specific gravities of the two ingredients, taken in the proportions in which they are present. (Because of a slight increase in volume which occurs when gasoline and benzol are mixed, the gravity of a blend is only

a close approximation to an average of the gravities of the two ingredients.) Hence, if the specific gravity of a gasoline from the eastern half of the United States is above 0.750, its distillation data should be examined for an indication of the presence of benzol.

2—Distillation Range

The most important items of information on the properties and characteristics of a gasoline which may be obtained from its distillation data are,

- a—Starting qualities.
- b—Ease of vaporization and distribution.
- c—Tendency to contaminate the lubricating oil.
- d—Composition (to some extent), particularly presence of benzol.
- e—Knocking characteristics (if the source and composition of the fuel be known).
- f—Tendency to deposit carbon in engine cylinders.

The distillation data of a gasoline can usually best be interpreted by plotting temperature against per cent distilled, as illustrated in Figs. 1 to 3. The distillation data arranged in this way is interpreted as follows:

- a—Starting Qualities. A low initial, 5 per cent distilling below 55 deg. C. (131 deg. Fahr.), characterizes a fuel of good starting qualities. Similarly, a high initial indicates poor starting qualities. Thus, in Fig. 2 the fuel having distillation char-

THIS manual, prepared in the form of a bulletin by the Fuel Section of the General Motors Research Corporation and edited by T. A. Boyd, contains much useful information which, so far as we are aware, has not heretofore been published in the concise and usable form in which it is here produced. Part II, which will appear in an early issue of *Automotive Industries*, gives in detail the methods followed in making tests of motor fuel and a description of the simple apparatus used in these tests.

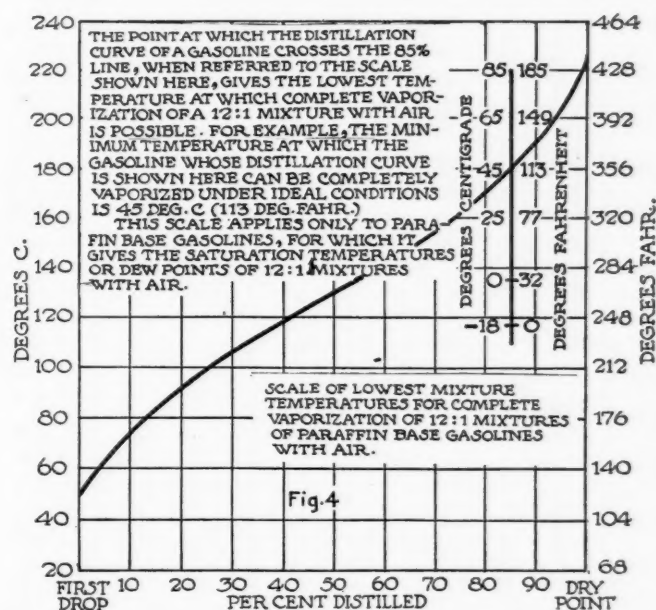
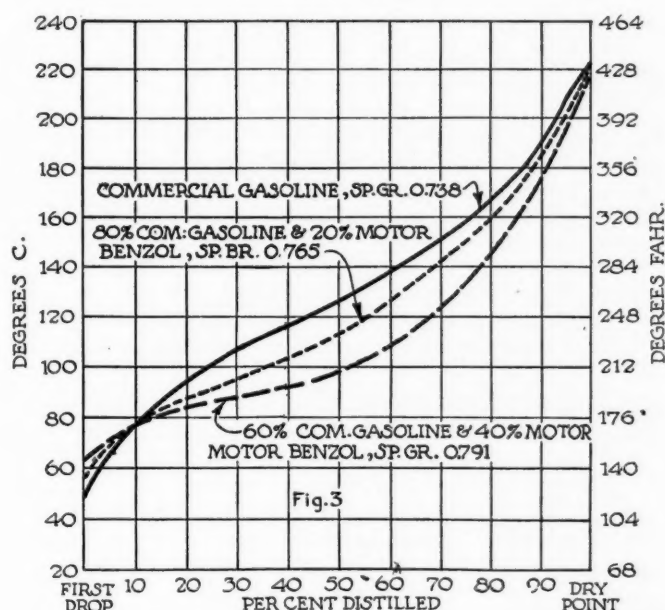
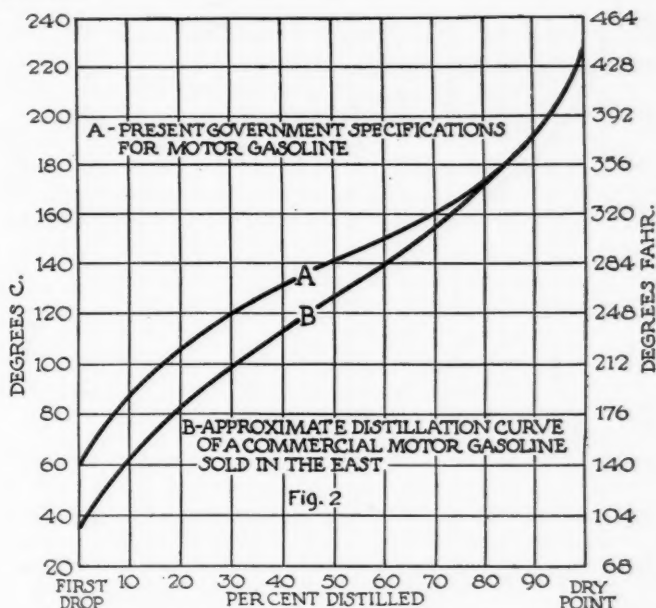
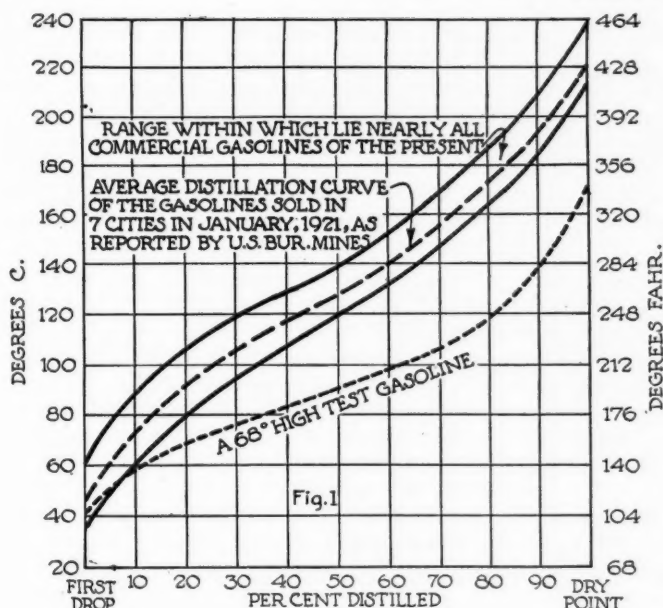


Fig. 1—Distillation curves of various grades of gasoline. Fig. 2—Distillation curves: A, for a gasoline corresponding to Government specifications, and B, for a commercial gasoline of lower average boiling point. Fig. 3—Distillation curves of commercial gasoline, and of gasoline-benzol blends. Note flattening of the curve in the 10 to 70 per cent range in the case of the blended fuels. Fig. 4—Curve showing the lowest temperature at which a gasoline with the distillation curve shown can be completely vaporized under ideal conditions

acteristics as shown in Curve B, has superior starting qualities to the fuel distilling as in Curve A.

- b—Ease of Vaporization and Distribution. The lower the distillation curve, the more easily a fuel may be vaporized. The distillation curves of nearly all commercial gasolines of the present lie within the range given in Fig. 1. The average volatility of commercial gasoline varies considerably from time to time. For this reason it is impossible to give a narrow range of values which will include the distillation curves of the gasolines that are sold for motor fuel commercially. For a like reason it is important that the distillation data of a gasoline, which is used in any experimental or testing work be known.

*Work done at the Research Laboratory of Massachusetts Institute of Technology under direction of R. E. Wilson. See *Journal Society of Automotive Engineers*, October, 1921, pp. 265-8, published complete in *Journal of Industrial and Engineering Chemistry*, Vol. 13, No. 10, October, 1921, pp. 906-12.

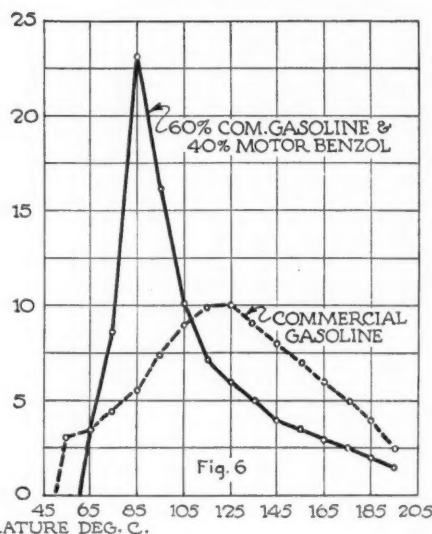
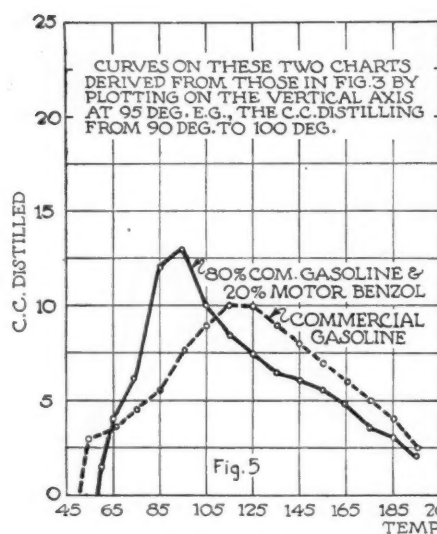
Especially is this true if comparative tests are being made in which more than one gasoline is used.

The results of recent work show that the temperature at which 85 per cent of a gasoline has distilled is of most importance in indicating its vaporization and distribution characteristics.* An empirical rule for determining the lowest mixture temperature at which complete vaporization or a dry mixture is possible for a 12:1 mixture is as follows: (This rule applies only to paraffin base gasolines.)

Temperature of 85 per cent point in degrees Centigrade — 135 = minimum dry mixture temperature, in degrees centigrade.

Temperature of 85 per cent point in degrees Fahrenheit — 243 = minimum dry mixture temperature, in degrees Fahrenheit.

These are the saturation temperatures, or dew points of 12:1 mixtures of air and gasoline. It



Figs. 5 and 6 show curves plotted from data (taken from Fig. 3) relating to the distillation curves of gasoline-benzol blends

is not possible commercially to obtain complete vaporization at these temperatures, but they may be used as an ideal upon which to base the performance of hotspots, etc. Fig. 4 illustrates the use of this rule in a graphical way.

c—Tendency to Contaminate the Lubricating Oil. Insofar as the nature of the fuel is a factor, the higher the 85 per cent point, the greater is the tendency toward dilution of the crankcase oil.

d—Composition, Particularly Presence of Benzol. A flattening of the distillation curve in the 10 to 70 per cent range (see lower curve in Fig. 3) usually indicates a blend. The gravity of the fuel should be noted in this connection. If it is high (above 0.750 for a fuel having an 85 per cent point not over 185 deg. C.), it indicates the probable presence of benzol. These same indications apply also to blends containing alcohol. Alcohol boils at about 78 deg. C. (173 deg. Fahr.) and has a specific gravity around 0.820. Alcohol alone is not soluble in gasoline unless practically no water is present; so that an alcohol-gasoline blend must contain a third material which serves as a binder, for which purpose benzol has mostly been used. If the distillation curve shows any peculiarity which might indicate a blend, it is of advantage to arrange the distillation data as shown in Figs. 5 and 6, plotting values taken from the ordinary type of curve referred to above.

The curves are plotted as in the following example: Assume that the initial of the gasoline is 50 deg. C. as in Fig. 3. A point is then located on the O vertical line at 50 deg. (Fig. 5). From the distillation curve (Fig. 3) the number of cubic centimeters coming over from 50 deg. to 60 deg. is noted, and this value is plotted as a point on the vertical axis at 55 deg. as in Fig. 5. In like manner the number of cc. distilling from 60 deg. to 70 deg. is plotted on the vertical axis at 65 deg. The same procedure is followed successively for the ranges 70 to 80, 80 to 90, etc. The area under the curve so obtained is proportional to the volume distilled, and any constituent which is present in considerable amounts produces a peak on the curve at about its boiling range.

Motor benzol boils at 80 to 170 deg. C. (176

to 338 deg. Fahr.) and considerably more than one-half of it comes over below 100 deg. C. (212 deg. Fahr.); so that its presence in a gasoline in any considerable percentage can readily be observed from the peak on the curve which shows the large amount of material coming over in its distillation range.

Because of the smoothness and freedom from knock with which the combustion of aromatic hydrocarbons (benzol and similar materials) is characterized, even at very high compressions, the presence of any considerable percentage of such materials in gasoline imparts combustion characteristics to the gasoline which do not belong to it alone and which it does not have commercially.

e—Knocking Characteristics. For fuels which are composed of paraffin hydrocarbons, the tendency to knock increases with distillation temperature. However, the knocking characteristics of a fuel are determined primarily by the nature of the materials of which it is composed, and secondarily by its distillation temperature. For example, a fuel which contains such materials as benzol or alcohol shows a decreased tendency to knock in proportion to the percentage of such material present. Most commercial gasolines as sold east of the Rocky Mountains are composed mainly of paraffin hydrocarbons, but the knocking characteristics of a fuel can be obtained from its distillation curve only when the composition of the fuel is known.

f—Tendency to Deposit Carbon in Engine. The amount of carbon which is formed in an engine from the fuel used increases with the distillation temperature of the fuel.

The height of the 85 per cent point gives a measure of this factor.

Because the amount of carbon deposited in an engine varies with a number of factors, no quantitative values can be given in this connection. Insofar as the fuel is a factor, however, the higher its distillation temperature the greater the amount of carbon deposited under any given set of conditions.

3—Acidity

Test should show no acidity. Acidity in gasoline indicates either (a) that the sulphuric acid used in refining was not completely removed from the gasoline, or (b) that either sulfonic acids or neutral esters of sulphuric acid were formed in the gasoline in the effort to produce a white product, and were not subsequently removed. The presence of any of these acid materials is harmful and unnecessary.

4—Percentage of Unsaturation

For development and testing work the unsaturation of a gasoline should not exceed 6 per cent, as determined by absorption in cold concentrated sulphuric acid.

The unsaturated or olefine hydrocarbons in gasoline are produced by cracking. They are characterized by the tendency of the molecules to polymerize or hook together with the consequent formation of larger molecules, some of which are gums or tars. While this action

goes on to some extent in gasolines containing only a small percentage of unsaturated materials and at ordinary temperatures, it increases with the percentage of unsaturation and it is very greatly accelerated by increase in temperature or the presence of acid materials. Trouble arising from the unsaturated constituents in gasoline is not common. If the percentage of unsaturation is high or the gasoline is old, tars are deposited in the induction system and especially on intake valves.

The percentage of unsaturation should be interpreted in connection with the content of gummy materials, as described immediately below. A gasoline which is low in unsaturation but which deposits a considerable amount of gums on evaporation is fully as unsatisfactory for use in testing work as is one which is high in percentage of unsaturation, but which gives little or no gums upon evaporation in the standard test.

5—Content of Gummy Materials

If a weighable amount of gum (or an amount which is distinctly visible in the dish) is deposited, the gasoline contains either gums as such, or undesirable gum-forming constituents.

Acid residues will show as gum in this test.

If the gasoline contains any dissolved elemental sulphur, the bottom of the dish will be colored gray or black.

This test should be interpreted in connection with that for percentage of unsaturation, as described immediately above.

6—Percentage Content of Aromatic Hydrocarbons (Benzol)

Benzol will stand compression pressures in excess of 200 lb. per sq. in. without knocking, and it imparts this characteristic to a gasoline or naphtha with which it is blended in proportion to the percentage of benzol present.

Fuels which contain benzol are therefore not comparable to commercial gasoline in the operation which they give in an engine.

Blends of benzol and petroleum oils containing from 20 to 60 per cent of benzol have been sold, and benzol has been blended with petroleum oils ranging from gasoline through the naphthas to kerosene. If desired the distillation range of the petroleum oil after it has been freed from benzol may be determined, but the character of the petroleum oil can be judged largely from its gravity after nitration and by the distillation curve of the original blend.

7—Purity of a Fuel As To Its Content of Paraffin Hydrocarbons

The gasolines sold east of the Rocky Mountains are composed mainly of hydrocarbons of the paraffin or chain type of structure. To these materials is due the characteristic operation of the commercial gasolines produced from our eastern and mid-continent crude oils, particularly the knock which begins to be apparent at about 75 lb. per sq. in. compression pressure. Some gasolines, especially those produced from California crude oils, contain considerable percentages of naphthene hydrocarbons. The naphthenes have the saturated ring structure, and, when compared for a given distillation range are characterized by higher specific gravities and by the ability to withstand much higher compressions without knocking than the paraffin hydrocarbons. For this reason the gasoline which is used in any testing work in which knocking characteristics are an important factor, should be tested for its purity as to content of paraffin hydrocarbons. This is best done by determining the temperature of dissolution (T. D.) of a

50-50 solution aniline and the fuel, or more accurately, the temperature of critical dissolution (T.C.D.) of the fuel with aniline, as described later.

If the T. D. or the T. C. D. is found to be approximately 70, the fuel is composed entirely of paraffin hydrocarbons. If, after the fuel has been nitrated and washed until it is entirely free from aromatic and unsaturated olefine hydrocarbons, it gives a low T. C. D., 30 to 55, the material thus obtained is not a pure paraffin fuel; but contains a considerable percentage of naphthene hydrocarbons, and is, therefore, not representative of the majority of the commercial gasolines in use in the United States.

8—Content of Alcohol

Alcohol, like benzol, can be used at compression pressures considerably above 200 lb. per sq. in. without knocking. It imparts this characteristic to a gasoline with which it is blended in proportion to the percentage of alcohol present, a smaller percentage of alcohol than benzol being required for a given suppression of the knock.

Fuels which contain alcohol are, therefore, not comparative to commercial gasoline in their operation in an engine.

Some alcohol-benzol-gasoline blends have been sold as motor fuel, but the amount of such material is small and its distribution is not wide. Commercial alcohol alone is not miscible with gasoline. An alcohol-gasoline or alcohol-naphtha blend must contain a third material which acts as a binder, for which purpose benzol has been most frequently used.

Heat Content of Motor Fuels

Alcohol has a much lower heating value than gasoline or benzol, about 80,000 B.t.u. per gallon for alcohol as compared to about 120,000 for gasoline and 130,000 for benzol.

(To be continued)

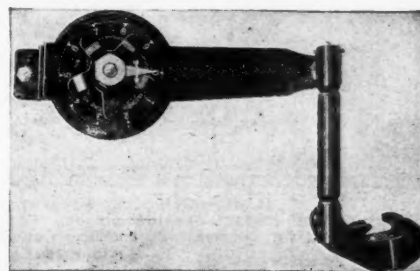
A "Trade" Motor Car

SPECIALLY designed motor cars carrying samples of textile and drapery goods will soon begin a tour of the European continent under direction of members of the British drapery and clothing associations.

This scheme is in line with the trade ship idea that is to be promulgated—ships carrying the goods of various manufacturers to different ports of the world where buyers may inspect them. Spain will be the first country visited by the motor car exhibits, and naturally the plan has advantages over the maritime exhibits in that inland cities and towns can be visited.

A New Model Shock Absorber

A NEW model shock absorber, shown in the accompanying cut, is being manufactured by Edward V. Hartford, Inc. The new model operates on the same principle used in the former Hartford absorber, but a tubular link now connects the arm of the shock absorber with the axle. Ball sockets at each end allow free side play.



New Hartford
shock absorber

Illinois Highway Department Makes Road Tests

New devices used in research work to determine comparative strength of various types of road pavement. Uniformity of subgrade under each of sections of road discovered by observations for moisture content and bearing power of soil under static and impact loads.

By Clifford Older and H. F. Clemmer*

CONCURRENTLY with the experiments carried on by the Federal Bureau of Public Roads at Arlington, Va., the Division of Highways, Illinois Department of Public Roads, is conducting research work in road building near Springfield, on what is known as the Bates Road, which parallels the Wabash Railroad for a distance of $2\frac{1}{2}$ miles. This road is on a relocation, and the fact that the old road will accommodate traffic for any reasonable length of time makes it possible to close the test road to all but carefully controlled test traffic. There are no curves in the road, and the grades do not exceed 0.4 per cent. The subgrade soil is a brown silt loam, except for two small stretches where it more nearly approaches gumbo. The road is surfaced with seven general types of pavement, as follows:

1. Portland cement concrete.
2. Three- and 4-in. lug brick constructed monolithic with a Portland cement concrete base.

*Chief engineer and engineer of tests of the Illinois Highway Department.

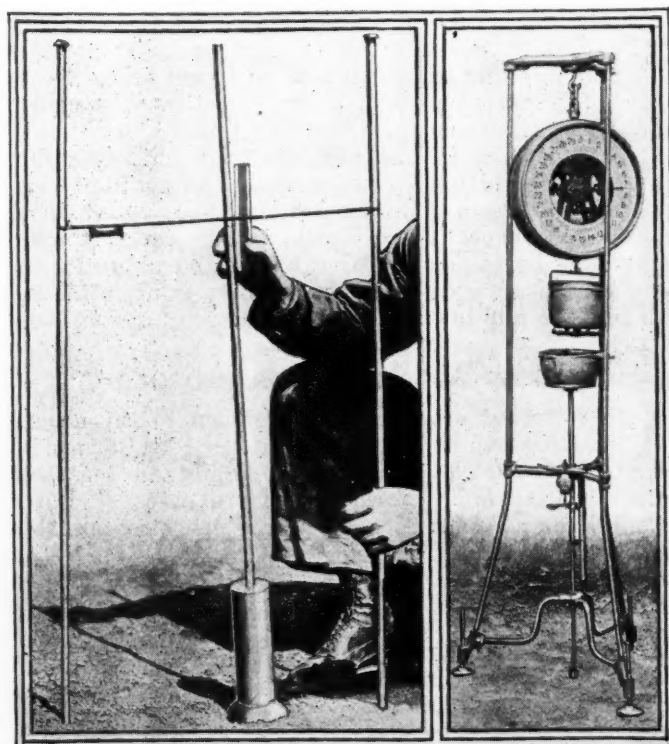


Fig. 1 (Left)—Goldbeck apparatus for determining subsoil impact bearing power. Fig. 2 (Right)—Apparatus for determining bearing power of subsoils under static loads

3. Three- and 4-in. lug brick constructed semi-monolithic with a Portland cement concrete base.

4. Three- and 4-in. bituminous-filled lug and lugless brick on Portland cement concrete base.

5. Three- and 4-in. bituminous-filled lug and lugless brick on macadam base.

6. Asphaltic concrete with and without binder course on Portland cement concrete base.

7. Asphaltic concrete with and without binder course on macadam base.

The series of test sections for each type or design cover all reasonable variations in strength that might be expected to give any degree of satisfaction under heavy traffic. Each series begins with a section roughly estimated to be equivalent in strength to 4 in. of concrete and increases to the approximate equivalent of 9 in. of concrete. In comparing the strength of concrete pavements with other types the following assumptions were made:

1. That a brick pavement constructed monolithic or semi-monolithic with concrete base has a strength equal to that of a concrete pavement of the same thickness and of the same quality of concrete as that used in the monolithic brick base.

2. That bituminous-filled brick on a concrete base has a strength equal to that of a concrete slab having a thickness equal to that of the base plus one-half of the thickness of the brick surface.

3. That bituminous concrete surfaces of 2-in. wearing course or $1\frac{1}{2}$ -in. wearing course with $1\frac{1}{2}$ -in. binder course have strength equal to 1 in. of concrete.

Moisture Content and Bearing Power

For the purpose of determining the uniformity of the subgrade under each of the 63 sections comprising the road, observations were made for moisture content and bearing power of soil under both static and impact loads at points 25 ft. apart along the center of the roadway. These observations were made immediately before pouring of the concrete. In addition, samples of the subgrade, secured from different points along the road, were sent to the United States Bureau of Public Roads for soil analysis and laboratory determinations of bearing power.

All materials used in the construction were carefully sampled and tested to determine their physical characteristics, and, in addition, test specimens of the concrete and other pavement types were made up from the materials entering into the pavement.

On each 200-ft. section of concrete pavement or base the following test specimens were prepared: Three

slabs for determination of transverse strength, nine cylinders for compression strength test, and three slump test specimens. In order to duplicate as nearly as possible the actual conditions of construction, concrete for these specimens was taken from batches during the run of the day's work.

It is planned to leave the concrete slabs buried in the road shoulders until the section represented is tested by artificial traffic. The slab will at that time be removed to the laboratory and broken on a Riehle testing machine to determine the maximum transverse strength. The slabs are, for the most part, of Portland cement concrete, varying only in mix and aggregates with the sections they accompany. In special sections test pieces were made so as to incorporate the features of the pavement, as monolithic brick, concrete with mesh reinforcing, concrete with an addition of calcium chloride, or concrete with asphaltic concrete surface.

One of the three cylinders buried with each slab is broken in the laboratory for maximum compression strength when four months old, the second after a period of eight months, and the third will be broken with the transverse slab at the time of testing the road.

Bearing Power of Subgrade

In the study of bearing power of the subgrade an attempt was made to compare the bearing power of the soils under impact as well as static loads. Comparison of the bearing power just before the pavement was laid and at various times after pouring the concrete was also attempted. The points at which the bearing power determinations were made were located 20 ft. apart along the center line of the road on the completed subgrade, and after the pavements were laid the determinations were made through the testing cylinders, which will be described later.

The impact determinations were made with the Goldbeck apparatus, shown in Fig. 1. The apparatus consists of a steel footing, 7 sq. in. in base area, into which is fitted a $\frac{1}{2}$ -in. steel rod about 3 $\frac{1}{2}$ ft. long. On the rod, fitted loosely so that it can be dropped from any height, is a steel cylinder of 10 lb. weight. The impact can be varied by dropping this weight from different heights. The depth of penetration is measured from a string stretched tightly between two steel rods driven firmly into the ground and set 2 ft. apart. On this string, which just clears the side of the rod, is suspended a small level. After any number of drops of the weight the distances are measured from the string to a given point on the rod with a 6-in. engineer's scale, and are recorded to one one-hundredth of an inch.

Static Load Determinations

A special apparatus for making the static load determinations has been designed by the Illinois Highway Division. As shown in Fig. 2, this apparatus consists of a three-legged iron pipe frame from which is suspended a Toledo automatic hanging scale supporting a pail which contains about 30 lb. of shot. The load is applied to the subgrade by means of a $\frac{1}{2}$ -in. steel rod terminating in a shoe $\frac{1}{2}$ in. in diameter on the bottom tapered back to $\frac{3}{8}$ in. $\frac{1}{8}$ in. above the bottom. On the top of this rod is a pan which receives the shot from the pail which hangs on the scale, described above. An Ames dial, connected to the frame, with its plunger resting on the support attached to the $\frac{1}{2}$ -in. rod, measures the depth of penetration as well as any upward movement of the rod due to elasticity of the soil. A thumb screw set in the frame enables the operator to stop the rod at will. At the 20-ft. distances on the center

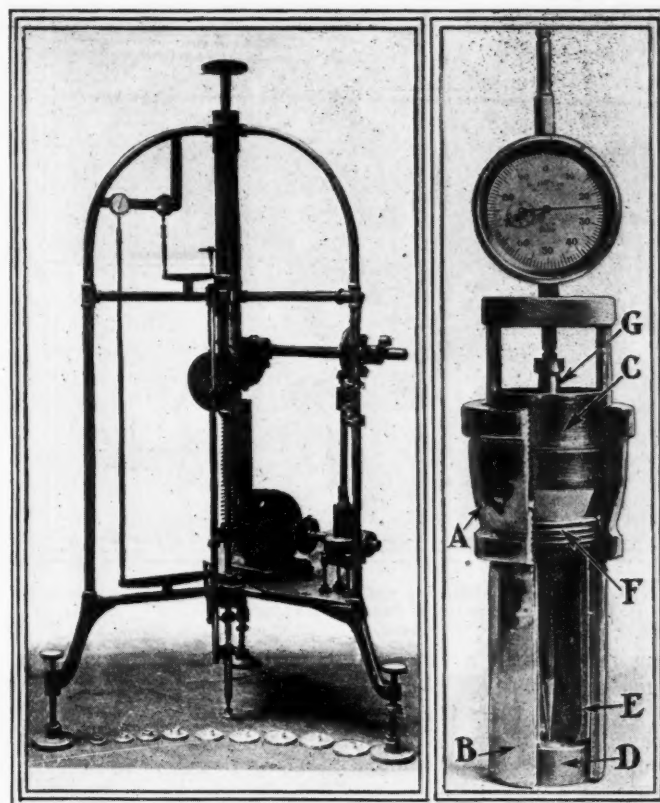


Fig. 3 (Left)—Repeated load testing machine. Fig. 4 (Right)—Subgrade testing cylinder

line of the road an initial reading was taken with the footing resting on the subgrade without any load, after which the shot was released and readings were taken for total loads of 10, 20 and 30 lb. Additional readings were taken for two minutes at intervals of thirty seconds under the 30-lb. load. The load was then removed and the upward movement of the rod, due to the elasticity of the soil, was measured. The 30-lb. load delivered a weight of 150 lb. per square inch to the subgrade. To determine the bearing power after the pavement had been laid, measurements of the penetration under static load were taken through the testing cylinders set in the pavement as well as at points 50 ft. apart along the edge of the pavement.

Behavior of Soils Under Repeated Loads

In addition to the observations made for determining the bearing power of the subgrade when subjected to static and impact loads, it is desired to know the effect produced by a load application which more nearly approximates the actual conditions brought to the subgrade when a truck wheel passes over a rigid surface.

From observations made November, 1920, on 7-in. surfaces it was indicated that the influence of an 8000-lb. wheel load was felt through a distance of 17 ft. on each side of the wheel. This would mean that the pressure produced at any point by a truck running at a moderate rate of speed would increase from zero to the maximum pressure in about one second, and decrease from the maximum to zero in the next second. The repeating load machine, which is shown in Fig. 3, was designed to approximate the above condition. The apparatus consists of a pipe frame in which are mounted a cam and spring for producing pressure and a plunger through which this pressure is delivered to the soil. The cam is driven by a 1/16-hp. electric motor.

By means of a scale along which a pointer on the spring moves, any desired pressure is registered. The

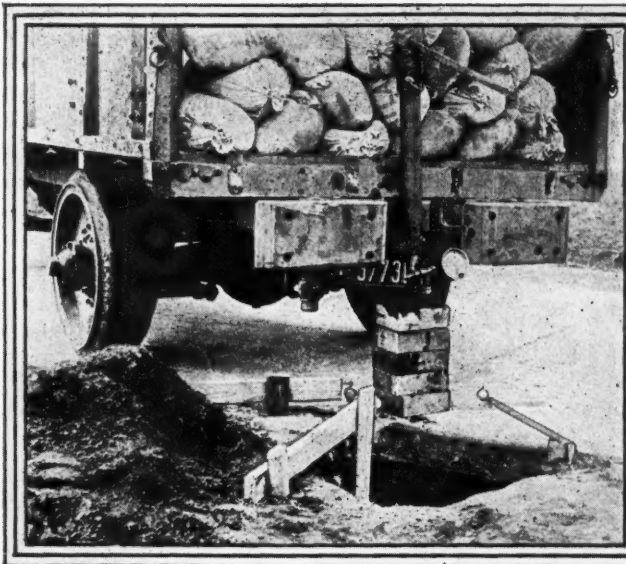


Fig. 5—Determining deflection of concrete slab with subsoil excavated

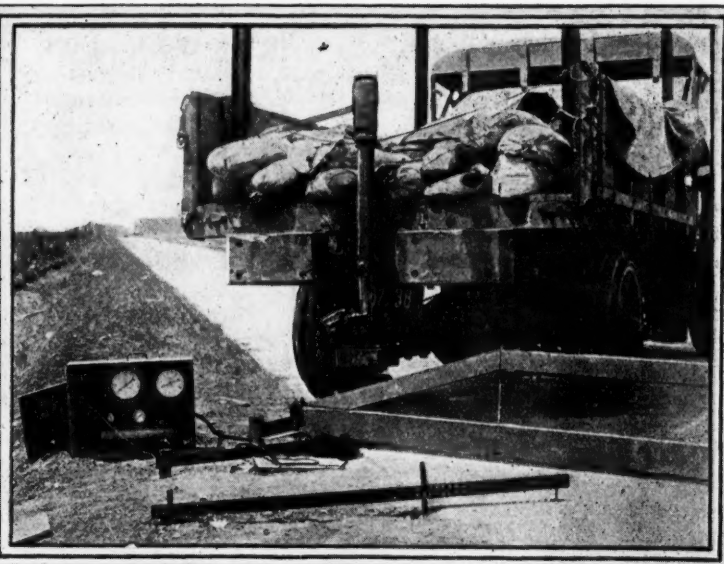


Fig. 6—Apparatus for determining deflection of road slabs due to temperature and load changes

cam revolves at a rate which will produce ten applications per minute. The movement of the plunger, which is identical with the movement of the soil under the pressure, is shown by an Ames dial. A second Ames dial is used to regulate the machine so as to keep the pressure constant. The different footings, as shown in the illustration, range in area from 1 to 10 sq. in. The effect produced upon a soil by these repeated loadings is assumed to be very much like that produced upon a subgrade when a number of trucks travel over a rigid surface. It is supposed, therefore, that the behavior of the soil under the plunger will be very much like that of the subgrade under a load. By means of this apparatus the data can be secured on the action of the soils of different densities and moisture contents when subject to repeated loads. To obtain some light on the effect of applying loads on areas of different sizes the different footings are used. These footings are loaded from 10 to 50 lb. per square inch, the loads being varied by means of an adjusting screw at the top of the frame.

Subgrade Testing Cylinder

The special subgrade testing cylinder, shown in Fig. 4, has been designed for study of the relative movements of the slab and subgrade. When the last of the cylinders have been set there will be approximately 800 of them in use. They consist of a $1\frac{1}{2} \times 1\frac{1}{4}$ -in. black iron reducer, A; a short length of $1\frac{1}{4}$ -in. black iron pipe, B; a $\frac{1}{2} \times 1\frac{1}{4}$ -in. brass disk, D; a short sleeve of 1-in. black iron pipe, E, and a special $\frac{1}{4} \times 1\frac{1}{4}$ -in. brass bearing plug, F. Reducer, A, is flush with the top of the pavement and disk, D, rests freely on the subgrade. The length of the pipe, B, and sleeve, E, vary with the thickness of the pavement in which the cylinders are used.

In the concrete sections these cylinders were installed when the pavement was constructed. In the bituminous concrete and brick pavements they were installed after construction of the pavement by boring holes with a Calyx core drill and grouting around them with care so as to assure satisfactory contact with the adjacent pavement.

The brass bearing disk, D, follows the downward movement of the pavement and the upward movement of the subgrade, so that any separation between the subgrade and the bottom of the pavement, due either to rutting caused by traffic or occasioned by moisture or

frost conditions, can be learned by measurements taken from this plug.

The device for reading the change in position of the bearing plug in relation to the pavement is shown very clearly in the illustration. It consists of an Ames dial fastened in a support, C, which rests on the stationary brass disk, F, and a rod, G, which fits into a small circular depression in the center of the bearing plug, D.

The difference between initial readings taken as soon as possible after the testing cylinders are placed and readings taken at subsequent time show any change in position between the subgrade and the pavement.

These bearing plugs can also be used to obtain data on bearing power of subgrade by loading them with the plunger of the static bearing power determinator.

By removing the brass bearing plug and iron sleeve these cylinders afford an excellent means of obtaining subgrade samples for moisture content determination. Also the brass bearing plugs in the cylinders give excellent points for taking precise levels so that the amount of heaving or settling can be determined.

The testing cylinders are set in rows of three and five across the pavement, the rows being 25 ft. apart. When five cylinders are set in a row they are placed in the center, at the quarter points, and 18 in. from the edges, and when three are used, the ones at the quarter points are omitted.

Slab Deflection Tests

For obtaining data on deflection of the various sections when subjected to different temperatures, as well as to repeated loads, eight Ames dials are set on any slab. Two dials are independently supported, while five are set in a beam which rests on two supports, one placed on the shoulder and the other placed in the subgrade through a hole in the center of the slab. Two thermometers are used, one for recording the air temperature and the other for obtaining the temperature of the concrete. Four sets of observations are made on each slab. In the first set of observations, which is made for determining the effects of change of temperature only, readings are taken on the thermometers and dials every half hour for 12 hr. In the second set of observations, taken for the purpose of determining the deflection caused by loads applied to the corners of the slabs, readings are taken for 24 hr. at half-hour intervals. From 4000 to 6000 lb. is applied at the corner

every hour. A reading is taken and the load is immediately released. One-half hour later a reading is taken without the load. The results obtained already show that the measurement of the load deflection would be futile without the determinations of temperature changes, because the warping of the surface, due to temperature variations, greatly exceeds the deflection under the loads applied.

Effect of Subgrade on Slab Deflection

For the purpose of securing some idea of the effect of the supporting power of the subgrade on the deflection of the slab after the 24-hr. run the subgrade is excavated under the corner (shown in Fig. 5) and several observations are made to determine the difference in the deflection of the slab when supported and when not supported by the subgrade. During the loading tests a strain gage is set along the diagonal for the purpose of securing some idea of the deflection of the upper surface. For the first 12 hr. of the loading run the dials are set along the diagonal 0—1 and for the second 12 hr. along the diagonal 0—2. This work is carried on by a corps of engineers divided into three shifts, each working 8 hr.,

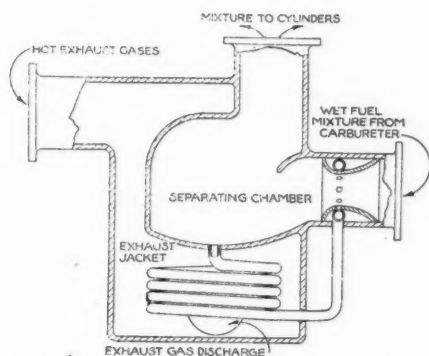
so that continuous readings are made day and night.

For determining the distribution of loads across joints and through pavement slabs of different thicknesses and types, soil pressure cells are placed under corners and centers of the slabs, and two Ames dials are set—one on each side of the joint about 2 in. from the edge of the pavement. The apparatus is shown in Fig. 6. A thermometer is supplied for registering air temperature. After the apparatus has been set up a loaded truck is brought slowly toward the point with its outer wheel about 6 in. from the edge of the pavement. The truck is stopped as soon as the dials give the first indication of the deflection of the pavement. Readings on the dials and the pressure cells are then taken, stopping the truck every 2 ft. to the joint and every 2 ft. beyond the joint until the dials again indicate that the truck is so far away as to cause no deflection. Because of the warping action of the slab and the temperature change, these readings are made at night as well as day, the daylight readings being taken between 9 a. m. and 4 p. m., and the second set the same day between 9 p. m. and 4 a. m. Especial attention is given to securing definite time intervals for each loading.

Some New Automotive Equipment

A New Fuel Vaporizer

A FUEL vaporizer designed to separate from the air stream liquid particles of fuel passing from carburetor to engine, convert these into a gas and again introduce them to the air stream, is shown in the accompanying diagrammatic sketch. Wet fuel mixture from the carburetor enters the central separating chamber through the Venturi tube at the right. The lower ve-



Diagrammatic view of Mitchel vaporizer

locity in the separating chamber and the change in direction of the air stream results in deposition of liquid fuel particles on the exhaust heated walls of this chamber. Portions of the fuel not vaporized by the wall contact are drained by gravity into the pipe coil which passes through the exhaust jacket and terminates in an annular space around the throat of the Venturi, whence the fuel vaporized in the heating coil again issues into the air stream and passes to the engine through the top outlet of the separating chamber.

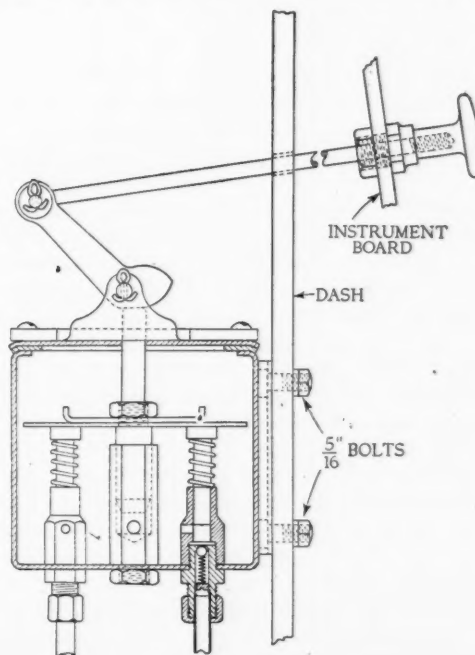
The device has been developed by G. I. Mitchel.

Chassis Lubricator

A MULTIPLE oiler for lubricating chassis parts is manufactured by the Manzel Brothers Company. It comprises a number of pumping units equal to the number of places to be oiled, which are assembled in the

oil reservoir and from which leads run to the bearings to be lubricated. The pumping units are operated by means of a pullrod extending through the dash and instrument board, the oil reservoir being mounted under the hood. From the reservoir connections are made to all the points on the chassis requiring lubrication. The system enables the driver to lubricate every bearing while sitting at the wheel, either while driving or while standing in the garage. The system can be supplied for any chassis and with any number of leads.

PISTON rings with packing material have proved very satisfactory in different kinds of machinery, and the German automobile engineer, Hanfland, proposes for use in automotive engines piston rings that have an annular groove on the outside which is filled with an oil-absorbing, heat-proof material, say a graphite composition.



Manzel chassis lubricator

British Air Ministry to Analyze Engine Development

Information regarding prevalent causes of failures will be particularly sought for. Number of researches will be carried out at universities. Future development to proceed with a multi-cylinder high compression engine. Aeronautical Research Committee reports on past experiences.

IN the annual report of the Aeronautical Research Committee for the year 1920-21, recently published, the work of the Engine Subcommittee is reviewed. Research work under the supervision of this committee was carried on at the Royal Aircraft Establishment, the National Physical Laboratory and the Air Ministry Laboratory at South Kensington. At the R. A. E. particular attention was paid to general problems affecting routine testing, as well as to some special problems, such as those connected with work on high flash point fuels, direct injection and ignition. At the N. P. L. a lengthy research on detonation was begun on lines laid down by Sir Dugald Clerk. Certain questions that came up were referred by the Director of Research to the Air Ministry Laboratory, such as a research concerning the present status of the internal combustion turbine and experiments on engines and air flow meters.

In developing a program of research the Engine Subcommittee kept in mind the urgent need for greater reliability in engines and power plants of aircraft. In this connection an analysis is being made of a large number of engine failures. For future development it has been decided to proceed with a multi-cylinder, high-compression engine, to discuss the design of an engine developing high power at altitude, to consider the possibilities of a high-speed aircraft engine and to investigate the use of high boiling liquids and water under pressure as cooling media.

Analysis of Engine Failures

It is proposed in the report that the Air Ministry analyze and issue in collected form, for the information of engine constructors, their experience as users of engines as regards points affecting reliability, and to arrange for continuing to do so in the future. Information regarding epidemic causes of failure which have occurred in the past should be collected in particular. The Air Ministry was asked to carry out reliability trials with various types of engines, which, in case no British engines of the type were available, would be of German manufacture. In accordance with this request, tests are now being carried out on four German engines of two types supplied by the R. A. F., the tests being those specified by the Air Ministry for new British designs.

A series of experiments on the effect of pressure and temperature on the occurrence of detonation are also in contemplation. Detonation has been experienced in the small tube between the explosion chamber and the recording diaphragm, but this has been overcome by placing the latter in the surface of the experimental vessel. This experience raises the interesting question whether detonation in a restricted volume, such as a small pocket at the spark plug, is a cause of detonation in the vessel, and this matter will be investigated. The

effect of turbulence on detonation will be investigated by the N. P. L., a small fan being placed inside the cylinder; also the effect of adding oxygen to the air of the mixture until a point is reached where detonation occurs. Mr. Ricardo, in a paper submitted to the committee, drew attention to the small amount of inert gas which is required to check detonation; he believes that 5 per cent of such gas is sufficient to enable a compression ratio of 5:1 to be increased to 6:1, while at the same time increasing the thermal efficiency from 31 to 33 per cent. Mr. Ricardo also expressed the opinion that prolonged detonation is liable to cause crystallization in engine cylinders, a matter which he plans to investigate further.

Accurate Air-Flow Meter

A report has been made to the committee on the Candler air-flow meter, which has been developed at the Air Ministry Laboratory at South Kensington. By means of an electrical method the instrument records the mean air flow through a tube, and it could readily be adapted to record the flow through an engine inlet pipe. Its chief advantage would reside in the possibility of its use for estimating the performance of engines at high altitudes. According to a further report on this flow meter, it was found to give an accurate measurement in all cases except when the flow reversed.

In connection with high-compression, supercharge engines, the question of variable valve timing is of interest. A delay in the closing of the inlet valve gives a lighter charge with a lesser chance of detonation. The use of the device for ground level control gives an estimated increase of 15 per cent in the available power and an increase of 7 per cent in fuel economy at half load at ground level. So far all experiments along this line have been made on a single-cylinder engine, but for the future experiments with a modified form of some existing aircraft engine, such as the Semi-Sikh, are contemplated.

Factors Causing Vibration

In response to matters suggested by the Director of Research, it is stated that it is at present very difficult to formulate rules for avoiding synchronous vibration in engines, but that it is possible to calculate from the completed design whether synchronism will occur or not. It is uncertain whether engines can be always installed in planes so as to avoid serious vibration. In connection with these problems a comparison of torque reactions in different types of engines has been drawn up.

Considerable attention has been given to the subject of the magneto, with special reference to the problem of eliminating trouble due to sparking across the safety gap at high altitudes and to the question of the compara-

tive qualities of British and German magnetos. The former arises through the safety gap sparking voltage, decreasing more rapidly than the spark plug voltage with reduced pressure. A contributing cause probably is the cooling of the cylinder, due to shutting off at high altitudes. The most serious case of sparking at the safety gap occurs in engines with super-compression, in which the compression pressure is maintained regardless of the altitude. Various solutions of this problem have been suggested, but nothing definite has yet been arrived at.

Tests with Induction Type Magneto

In an investigation previously reported it was shown that the optimum results from an inductor type of magneto with a shunted resistance were obtained by reducing the number of secondary turns from the standard 10,000 to 7000, the sparking performance with a shunted resistance being increased from 45 to 60 per cent by

this means. The observations have now been extended to a rotating armature magneto (Bosch DU-4), and the results show that the optimum number of secondary turns is 7200, as against the standard, 8400; the average increase in performance was 11 per cent, while the shape of the low-speed characteristic was practically unaltered. The shunted secondary capacity characteristics showed an increase in performance of 12 per cent.

During the coming year a certain number of researches are to be carried out at universities, and in this connection consideration has been given to various designs of test bed. The Ricardo unit proved the most useful and was recommended by the committee. For other work the R. A. E. is developing a design of universal test bed suitable for the fitting of different types and sizes of cylinder.

A new altitude test chamber is to be constructed, as the existing plant at the R. A. E. is inadequate to test present-day engines with satisfactory results.

New Fiat Racer in Italian Grand Prix

IN the Italian Grand Prix race, briefly reported in our Sept. 8 issue, a new design of racing car due to the Fiat company of Turin made its initial public appearance. These cars are fitted with eight-cylinder-in-line engines of 65 by 112 mm. (2.56 x 4.41 in.) bore and stroke. A sheet steel water jacket surrounds each group of four cylinders. There are two valves inclined in the head, the spark plug is in the center and two separate camshafts are used, the drive being at the rear by means of a vertical shaft. By means of bevel gearing this shaft also drives two four-cylinder magnetos.

One of the features of this engine is the extensive use of roller bearings, the crankshaft being carried in ten bearings of this type. Roller bearings are also used for the connecting rod ends and for the valve operating gear. Lubrication is under pressure with a dry sump. The engine is mounted directly in the frame by four points and has the gearbox housing bolted up to its rear. Water is circulated by means of a pump, and a draught of cold air is directed through the crankcase. Maximum power is developed at about 4300 r.p.m., when it is believed that the engine gives off about 112 hp. No authentic information has been given out on this point, but it is known that the engine will run up under load to 4600 r.p.m.

Both drive and torque are taken through the springs, which are underslung semi-elliptics. The gear ratio used in the race was 14-52, compared with 14-45 for the Ballots, both with 33 x 5-in. tires. Brakes are applied simultaneously on all four wheels, the drums in front being rather smaller than those on the rear. Fabric lining is used in front and cast iron at the rear.

All cars in the race used the new Pirelli straight-side cord tire of 33 x 5 in. Ralph De Palma started out without a spare, but the others carried one wheel at the rear. The big straight sides making the cars rather heavy to steer, Goux decided to use Pirelli clincher-bead, 32 x 4-in. tires on the front, these being of fabric construction. Wagner tried this combination in practice, but after he had lost a tire off the rim at more than 100 miles an hour, he considered it unsafe. The service given by Pirellis on the Ballot cars was excellent, the two leading cars finishing with their tires in condition to run, doubtless, another couple of hundred miles. The Fiat drivers, particularly Wagner, had many tire stops, and it was claimed that the reason the Pirellis did not stand up so well on the Fiats was their higher center

of gravity. This is denied by the Fiat engineers, who claim that the difference in this respect is not more than an inch. The Ballot frames are 14 1/4 in. from the ground and the Fiats 15 7/16 in.

The winning Ballot cars are the machines which ran in the French Grand Prix at Le Mans. De Palma had the car with which he ran at Indianapolis.

African Automobile Trade

A WRITER in the London *Times* Trade Supplement cites Nigeria and the Gold Coast as places where local conditions impose big difficulties on British automobile truck makers to fit in with their special local requirements. As regards Nigeria he says: "At present vehicles using the more heavily metalled Nigerian roads must be fitted with rubber tires of a width of not less than the number of inches equal to the number of half tons of registered axle weight. No axle weight may exceed 4 tons, and the total axle weights of a vehicle must not exceed 5 1/2 British tons (12,320 lb.). If the vehicle is used at all on light-metalled or clay surfaced roads, it must be fitted with air tires on all wheels."

Moreover, a change in the law as from the beginning of 1923 provides that only air tires may be used on any of the roads and that no vehicle may be fitted with double tires. This regulation he thinks will compel the use of giant air tires on all but the lightest vehicles.

As to the Gold Coast situation, there the gross weight of a vehicle, including driver and passengers, must not exceed 2 1/2 British tons (5600 lb.), though exceptions may be allowed by district commissioners.

Consequently local buyers are justified in placing orders for automobiles with makers who act in response to, and even in anticipation of these restrictions, and who design their automobiles accordingly to meet the largest needs of the greatest number of export markets. It is precisely because American automobiles embody these features that they now hold markets, as well as making others, to which on national grounds they have no such prescriptive title as the Britisher.

THE President of Peru has submitted a law to the Chamber of Deputies providing for the nationalization of all petroleum deposits found in the country. Recent investigations have produced results showing the presence of extensive deposits of oil.

Precision Machine Work in the Production of Aluminum Pistons

Methods employed in manufacturing pistons for the Essex engine. Special care exercised in machining the piston pin hole square with piston axis, and in aligning piston with cylinder bore.

By J. Edward Schipper

A NEW piston has recently been adopted for the Essex automobile which is not only interesting from a design standpoint, but presents some special manufacturing considerations which are unique. The entire layout for manufacturing this piston has been arranged in the belief that piston wear, oil pumping and failure of the piston rings to properly engage the cylinder bore are due in a large measure to misalignment. This misalignment causes tilting, or what is known in shop parlance as cocking of the piston in the cylinder, and results in one side of the piston acting as an oil scraper, thus giving unequal lubrication around the cylinder walls. The rings also tend to rotate and make it difficult or impossible to secure a good seal.

The pistons are manufactured from Lynite aluminum alloy. They are permanent mold castings and weigh 20 oz. before machining. The finished piston averages 13.5 oz. in weight, hence 6.5 oz. of metal is cut from each piston. The manufacturing schedule is based on the production of 550 pistons per day, so that the piston department machines off slightly more than 223 lb. of aluminum per day.

In following through the chain of operations necessary to complete an Essex piston the point which should be borne in mind is that in every operation where the consideration enters as a factor at all, parallel alignment of the piston pin hole with the head of the piston is very carefully maintained, as well as squareness of the piston pin hole with the vertical axis of the piston.

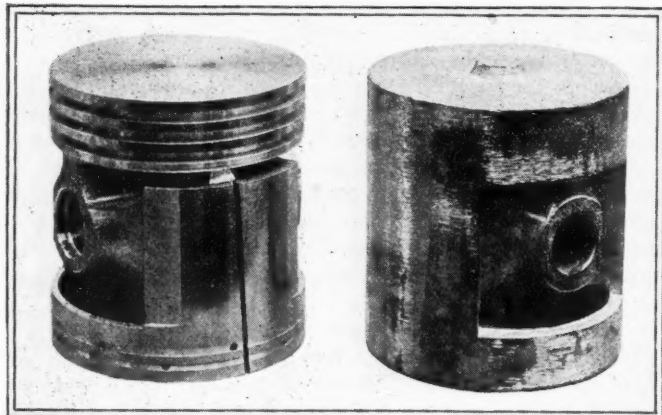
The first operation is to bore the open end of the piston. An unusual method of centering is employed in this operation. The centering tool comes in from the back of the No. 2 Warner & Swasey screw machine through the chuck and cuts a center in the projection

which is left on the center of the piston head for the purpose. The location is so arranged that the center mark must align itself exactly with the center of the open end of the piston. The latter piston is centered on a cone guide, which is exactly concentric with the centering tool. After centering, the open end is bored.

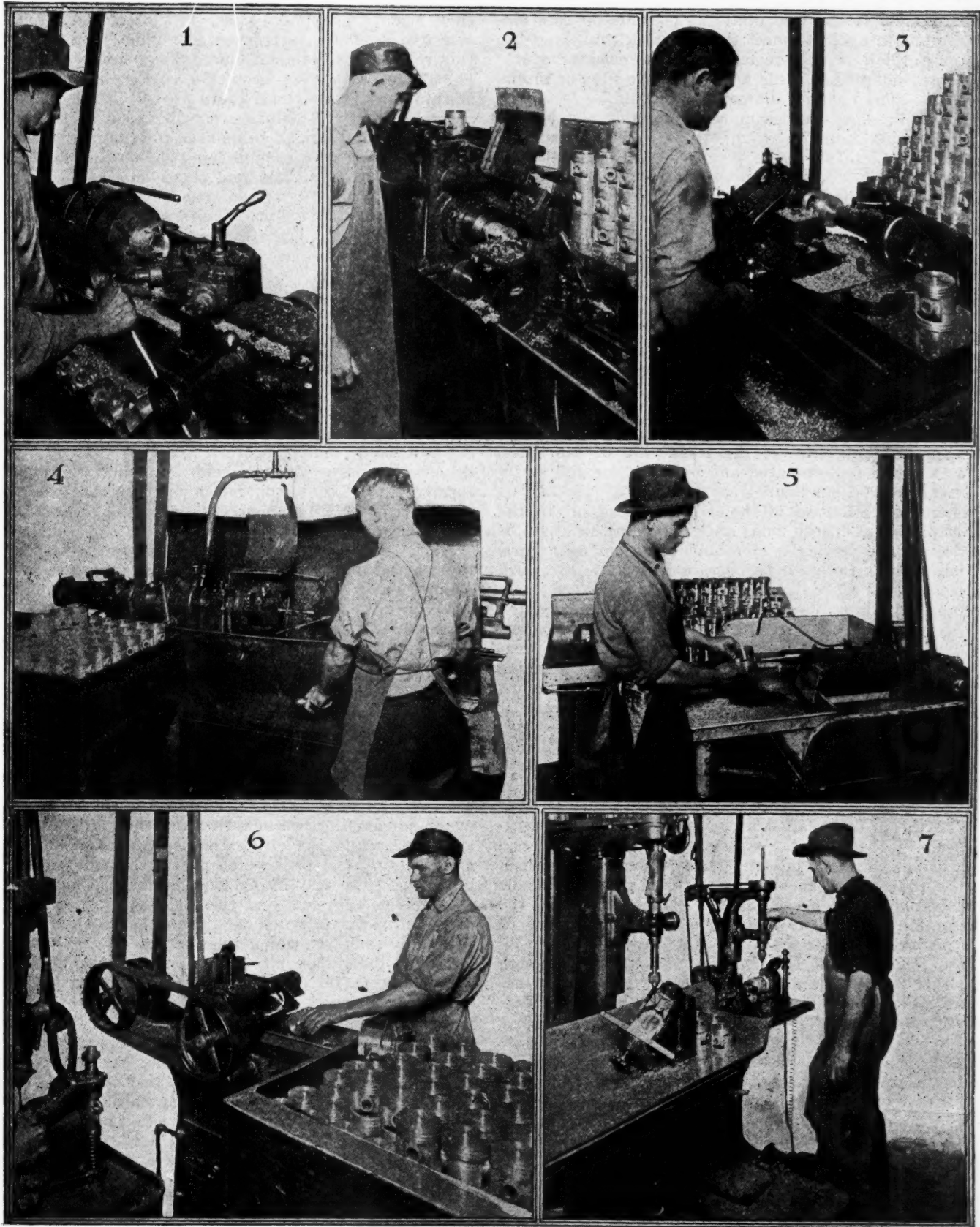
A Fay automatic lathe is used for turning the outside diameter and facing the end of the piston. This same machine also rough cuts and finish cuts the ring grooves. The finish is a sort of sizing or burnish which gives a mirror finish. For this work the piston is located from the open end, which was bored on the first operation, and from the center, which was cut on the piston head. This machine is the fundamental factor in timing the operations all through the department, as its capacity is 60 per hour, which is less than any other of the operations performed. The finished ring grooves on this machine are held to a tolerance limit of $\pm .0005$ in., — 0.

The piston head is faced and the fourth piston ring land is undercut in the next operation. The fourth piston pin land is undercut to allow the ring to project .0125 in. on each side, or, in other words, the total diameter of the fourth piston pin land is .025 in. less than the diameter of the other land. This allows the lower ring to act as an oil scraper. The work is done on a Porter cable lathe, and the location is from the open end of the piston and from the center. The work revolves in this operation and is driven by a pin on the cone seat which bears against the piston pin boss.

One of the most interesting operations in the manufacture of the piston is the cross-boring, which is done with great care in a pot-chuck on a No. 4 Warner & Swasey turret lathe or screw machine. The pot-chuck is so arranged that the location is from the flat of the piston head to give the proper distance from this flat surface to the center line of the piston pin hole. The alignment in reference to the bosses is made sure by first inserting a lining bar which enters the cored hole. The next tool which comes into operation is a boring drill and the third a piloted, single-cutter boring tool, which takes a truing cut and gives an accurate alignment of the hole. The next tool on the turret is a floating reamer which accurately sizes the holes, after which another tool cuts two pin-retaining grooves in the piston pin bosses. On this machine the work revolves and the tools are piloted on both sides, this being accomplished by a pilot in the jig on the far end and pilot bushing on the near end which enters the hole and acts as a pilot bearing for the tool. For lubrication on making this cut, and a great majority of the cuts throughout the manufacture of this piston, a mixture of kerosene and so-called mineral "lard" oil is employed. This has



Finished Essex piston and blank from which it is made. The finished piston weighs 13.5 oz. and the blank casting 20 oz.



1—Boring open end of piston and establishing center. 2—Turning overall diameter and facing end of piston on a Fay automatic lathe. This same machine also rough and finish cuts the ring groove. 3—Facing the piston head and under-cutting the lower piston ring land. 4—Cross-boring the piston in a pot-chuck with special provisions for accuracy in boring by piloting the tools. 5—Hand reaming the piston pin hole after cross-boring operation has been completed. 6—Sawing a $\frac{1}{8}$ in. slot under the bottom piston ring. Note simple locating method in V-block. 7—Drilling twelve oil holes in the piston skirt on an indexing fixture which takes care of spacing as well as stagger

been found to assist in giving a very clean surface. The work is held to as close limits as possible on this machine, but in order to meet the tolerances required the piston pin hole is hand-reamed after the machine operations are completed. This hole is held to plus or minus .0003 in. The nominal diameter is .875 in.

A 3/16-in. slot is sawed under the bottom piston ring. For this operation the piston drops over a dowel pin, which passes through the piston pin hole and into a V locating block. No clamp is necessary to hold the piston in this jig, as the action of the saw, which is downward, tends to force the piston directly into the V block. The saw has a capacity of 200 pistons per hour.

There are twelve oil holes in the piston skirt, each 3/32 in. in diameter. The holes are equally spaced circumferentially about the piston, but are staggered in an axial direction. This work is accomplished on a Leland Gifford drill, to which is fitted an indexing fixture which rotates the piston in the jig and spaces the holes properly. To take care of the stagger in the holes the fixture brings the work back and forth by means of a cam. The pistons are held in position on a spring clamp, which allows the cam to move the work back and forth, taking care of the staggering of the holes. The fixture is foot-operated and one machine can easily take care of 200 per hour.

There are also two oil holes which lead oil to the wrist pin boss. These holes are inclined at an angle of 50 deg. to the vertical and require an indexing fixture, which permits the drill to operate vertically, the work being inclined at the proper angle.

The location of the work in the fixture is from the piston pin hole by means of a locating pin which passes through the holes. These are 1/8-in. holes, and the machine has a capacity of 100 per hour. The machine used is a Sipp drill. Another Sipp drill is used for chamfering the wrist pin hole to break the corner at this point and to prevent a burr in assembly.

Grinding Operations

For grinding the piston pin boss relief a Landis grinder is employed. The work is located by the open end of the piston against a cone seat with a driver fitting closely between the piston pin bosses. A special cam brings the work in contact with the grinding wheel at the four points at which the relief grind is taken; that is, one point on each side of each extremity of the piston pin boss. The machine readily takes care of 150 pistons per hour.

The same type of Landis grinder is used for rough grinding the outside diameter. This is a 6 x 18-in. machine, which takes off a roughing cut of .012 in. per side, leaving for a finish grind .0015 in. on each side. The rough grinding operation is taken care of at the rate of 100 per hour.

Particular care is taken in the finish grinding to hold the temperature of the cooling system for the machine within the desired range. It was found, in checking up the piston diameter, that a considerable temperature variation in the cooling system, such as might be experienced in cold weather, caused a variation in the diameters of the pistons turned out in the morning and later in the day, when the temperature was higher. In order to overcome this the temperature of the cooling medium is held at between 65 to 70 deg. Fahr. in order that more metal is not ground off on a warm day than is taken off on a cold day. The wheel used for finish grinding is a 36-L crystolon, this being a Norton wheel, and is the same wheel used for the rough grind. The relief grinding is done with a No. 24 CL Alundum wheel.

The range of variation in the cylinder bore is .002 in.

by steps of .0005 in., which is the machining limit on each size. The piston sizes, which are arranged for selective assembly, are seven in number and fit within this range. The nominal outside diameter of the piston is 3.372 in., with a variation of +.0015 in. and -.0005 in. Within this .002-in. limit there are seven selections for assembly, and the pistons are gaged and marked in accord with this. The machine used for gaging the pistons is the ordinary type of amplifying gage, which is checked up with a master plug, and the symbol for size is a letter stamped on the piston after gaging. The operator on the finish grinding machine is also provided with an amplifying gage for checking outside diameter for size and roundness before the piston goes to the inspection department.

The Final Cuts

Following the finish grinding and inspection, the center is faced off on a Sipp drill. A final cut is then taken on the piston pin hole and the diameter checked with a go and no-go gage. The limits of the piston pin are shown by the diameters of the gage, which are .8747 on the go side and .8753 on the no-go side. This final cut is a hand-reaming operation, the ream being power-driven and the work hand-held. This differs from the former hand-reaming operation only in that the ream is driven at 60 r.p.m., whereas the first hand-ream had a reamer speed of 80 r.p.m.

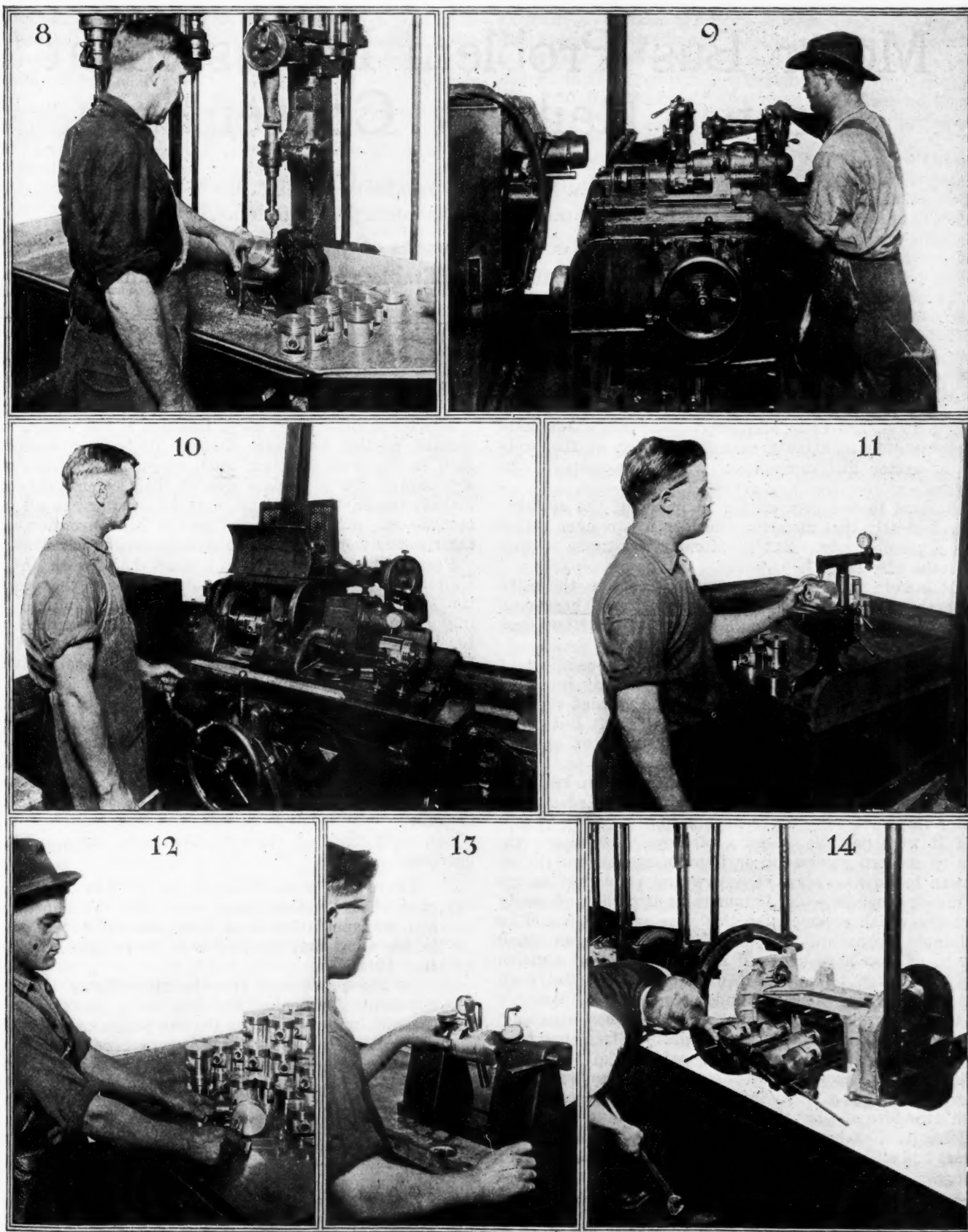
At this point a line is drawn through the piston center line on the piston head. This line is drawn by means of an eccentric and a plug through the piston pin hole. The eccentric brings the piston down against the face plate, and the center line is then drawn on the top of the piston parallel with the axis of the piston pin hole. The purpose of this is for lining up in assembly with the connecting rod.

The skirt of the piston is split by means of a 1/16-in. saw-cut. The slot cut in the skirt is on an angle so that the slot does not work vertically up and down in the cylinder, but has a sliding action.

For checking the piston head and the accuracy of the cross-bore, a special inspection gage is employed which has amplifying gages in which the indicator points are run around the circumference of the piston head and also on a mandrel which passes through the piston pin holes. The amplifying gage is checked against the mandrel on one side, and the piston turns around 180 deg. and the amplifying gage then checks on the other side of the mandrel, which gives accurately any misalignments in the piston pin hole. Each of the pistons is stamped with the weight, which is necessary in the selective assembly.

An interesting phase in the assembly of the pistons, which is really a check on the piston itself, is the piston aligning fixture, which is bolted to the crankcase on the crankcase assembly line. It is in this aligning fixture that the line on the top of the piston is used. The fixture is so arranged that it has a gage with two high points, both of which must touch the piston head. If one touches and the other does not, the connecting rod is brought up to perfect alignment, so that both of the high spots on the aligning fixture will touch. The center line drawn on top of the piston must then also be parallel with the line on the aligning fixture.

Inasmuch as this fixture goes directly on the crankcase itself and is a part of the assembly operation of the engine, it gives a final check-up on the alignment of the piston and makes it certain that the piston will be operating on a true axis. This is the final step and illustrates the care given to avoid tilting of the piston in the bore.



8—Drilling two oil holes for the wrist pin. These holes are inclined at an angle of 50 deg. to the vertical. 9—Grinding the piston pin boss relief on a Landis grinder. 10—Grinding outside diameter of piston. 11—Amplifying gage and master plug used for checking same employed in piston inspection. 12—Drawing center line on piston head in a special jig. 13—Inspection gage for checking squareness of head and piston bore. 14—Aligning jig which is fastened to the crankcase to check up on squareness of piston. The center line is checked against a straight edge on the jig as illustrated, to make piston float freely

Motor Bus Problem Discussed at Electric Railway Convention

Conservative traction interests apparently regard bus lines as competitors rather than as possible aids in solving transportation problems. It is evident, however, that the most economic means of transportation will survive in any given case. Mutually profitable cooperation is possible.

By Sinclair Gluck*

THE fortieth annual convention of the American Electric Railway Association at Atlantic City, October 3 to 6, has come and gone. And any interest at the convention in a comprehensive solution of the problem of motor bus competition was conspicuous by its absence.

Allusions to bus competition in many of the speeches showed clearly that members consider it a danger rather than a possible ally. But no attempt was made to face the issue directly.

There were two elements present. One side, the more conservative, was greatly in the majority. These men seemed to regard the bus as a menace to their business and nothing more.

The other and more progressive side, consisting of only a few men, some of whom have already installed buses to co-operate with their trolleys, regarded the bus not only as a possible but as an actual ally. But these men made no headway against the weight of opinion ranked against them.

Taking the convention as a whole, the motor bus may be said to have been almost entirely disregarded as a factor in street car line transportation.

If it were possible to get a birdseye view of any extensive modern movement or improvement, from its inception to its final stage, the slow and ponderous nature of the development—the innumerable bypaths and costly blunders which accompanied this development—would be strikingly apparent. Single individuals or even small groups of men have dreamed a dream and seen a vision that has taken them almost directly to the final goal. But give the movement a broader scope and the wastage of time and misdirected effort often becomes appalling.

Passenger transportation in the United States has been no exception, principally because, aside from the steam railroad, the development of passenger transportation has been in the hands of many individuals, working locally, and with little idea of what the other fellow is doing or why he is doing it. Few have been able to profit by the blunders of others and still fewer to take advantage of the successes of others.

Little Effort to Solve Problem

There are organized and influential groups of men in the passenger transportation business, aside from the steam railroads. There are the electric railway interests and there are the manufacturers of buses and of truck chassis convertible into buses. But it is necessary for both of these important groups to work in a fundamentally con-

structive way to solve the short haul passenger transportation problem.

There was little effort along this line at the annual convention of the American Electric Railway Association. Men in the transportation business—men of vision who say beyond the immediate sale of their commodity, to a market better, broader and more satisfactory to all concerned—may have held great hopes in this convention. But their hopes were justified to a very limited extent.

Passenger transportation in short haul work in the United States is in a chaotic state of flux at the present time. Here and there, in cities such as New York, Washington and Toledo, well organized, efficiently operated motor bus lines are working in conjunction with street car lines to a greater profit of both and the general satisfaction of the public. Here and there in other cities more or less well organized bus lines are competing with street cars at a profit to themselves and a heavy loss to the electric lines. Here and there jitneys operated on a shoe string are cutting down the number of street car patrons at little profit to themselves. Elsewhere buses have tried to compete and have failed. The difference in the outcome has depended upon local conditions and the efficiency with which each type of transportation was organized and operated.

There can be no doubt in the mind of the intelligent observer that there is a field for short-haul bus transportation. And there should be no doubt in his mind that the bus is to be reckoned with in that field.

At the convention the electric railway interests apparently regarded the bus as a powerful and threatening factor. And the bus was regarded so far as most of the set speeches were concerned, as an opponent only—not a possible ally.

On the whole, the attitude of the speakers somewhat resembled the King Canute point of view. The more conservative electric traction interests do not want the tide of bus competition to rise any higher. So it seemed to be generally conceded that the best thing to do was to order it back, by means of legislation and of a great publicity campaign, extolling the benefits of street car lines to municipalities and the general public, and decrying buses as undependable, incapable of handling the traffic and unwilling or unable to stand their share of municipal duties and municipal taxation.

One speaker stated that there was only one successful bus line in the United States, the Fifth Avenue Coach Co.

Another stated that no bus line stood its share of municipal expenses.

*Managing Editor *The Commercial Vehicle*.

There are many successful bus lines in California and elsewhere. Bus lines pay taxes and in some cases have franchises. And the work of the Fifth Avenue Coach Co. in clearing the snow during the last two winters from the streets on which it operates was an excellent example to municipalities far and wide.

But far more important than any inaccuracy of statement was the mistaken attitude of the convention toward the entire problem. After all, it is the most economical form of transportation which should—and will—survive. The question, fundamentally, is not one of profit for traction companies now in business and in no hurry to go out of business, but one of solving the problem of the most economical and efficient form of transportation in each locality and under each set of conditions.

Either the street car lines are of real and permanent value to the communities in which they operate, or they are not. If they are of permanent value they will survive and they have little to fear, except possibly financial mismanagement and inefficient operation. If they are not of real and permanent value in their particular communities, the directors and stockholders should read the writing on the wall and either get out of a bad business altogether or adopt the type of transportation which will solve the problem in their communities—for if they are not of real and permanent value, *they will not survive.*

Committee Report Not Ready

Some of the electric railway interests have realized the importance of a clear understanding of bus transportation. A committee of fourteen had been previously appointed, under the chairmanship of H. B. Flowers, vice-president of the United Railways & Electric Co. of Baltimore, to inquire into the question of trackless transportation. Unfortunately, the committee had not sufficient time to prepare a comprehensive report.

At the general meeting on Wednesday, October 5, in the morning, Mr. Flowers, the committee chairman, announced that he had only a progress report to make. He asked that the committee be reappointed further to consider the question of trackless transportation. He stated as his view that the trackless trolley and the motor bus must be conceded a place in the sun and that more time should be granted the committee to inquire further into this important subject.

It has been stated that of the fourteen reports of sub-committees which should have been turned into the committee, only two were available in time for the convention. One of these, the report of the sub-committee representing motor bus manufacturers, was turned in to the committee. No notice was taken of this report on the floor of the convention.

The two members of the committee, F. W. Fenn of the National Automobile Chamber of Commerce, and D. C. Fenner of the International Motor Co., who represented this sub-committee, were present at this session with a recommendation which they had prepared dealing with the manufacturer's angle on trackless transportation.

The report of the committee on publicity called attention to the failure of buses to handle the traffic in Des Moines when street car lines were discontinued. There were numerous leaflets available dealing with the Des Moines situation and attacking the bus generally.

Competition Felt

F. E. Frothingham, of Coffin & Burr, Boston, Mass., stated that the street car lines have been subjected to severe competition in the jitney and in bus lines. This was badly met. The street car lines ridiculed it instead of in-

sisting on fair competition and trying to absorb this competition. This attitude resulted in hostility from the public. He stated that the Fifth Avenue Coach Co. was the only successful bus line in the United States, and went on to say that possibly trackless trolleys might solve the problem of this competition for the street car line. But, he said, that if there must be competition, buses and jitneys must bear their share of street maintenance in clearing snow just as the street car lines do.

J. K. Newman, Isadore Newman & Sons, New Orleans, La., also spoke on the subject of street car line finance, municipal ownership, etc. He referred in passing to jitneys and buses. The gist of his remarks was as follows: Jitneys and buses take money from the street car lines. When this happens the street car lines have to raise their fares to meet expenses and the public suffers accordingly. If the street car lines are discontinued, he said, up will go the fares on the buses and down will go the service. It is not clear from the above why the public which takes the bus should suffer because the street car line raises its fare. And the question of increased fare and decreased service on the bus lines, once the street car lines are discontinued, is problematical to say the least.

Finally, he said, that as street car lines are discontinued the city will lose the franchise and the paving done by the street car lines. Jitneys and bus lines, he stated, should not be permitted in competition with trolley lines any more than two fire departments should be permitted. City franchises should guarantee no jitney or bus competition with street car lines.

Edwin Gruhl, vice-president and general manager of the North American Co., New York, in the course of his speech also touched on the subject of motor bus competition. He states that "While the motor bus has the advantage of low investment and small overhead expense, and greater speed and flexibility of operation, the operating cost of a motor bus per seat mile is practically twice that of an electric car. It is not likely, therefore, to seriously menace the industry except during periods of unemployment." According to a prominent bus operator these figures are based on the 16-passenger bus and do not apply to buses of larger capacity.

These remarks are characteristic of most of the speeches in which jitneys and motor buses were mentioned. But it must not be understood that all members of the American Railway Association are inclined to disregard the real value and importance of motor bus transportation. H. B. Flowers, general manager of the United Railways & Electric Co. of Baltimore, and chairman of the committee on trackless transportation, is very much in favor of the use of buses by street car lines. His company was one of the first to use buses, operating first twelve and then fifteen. The company is now going in for larger buses and may possibly experiment with double deckers.

In the debate on Tuesday J. P. Barnes, president of the Louisville Railway, led the progressive element. He said that the electric railway should regard itself as the transportation purveyor of the community, and as such should use every means available to improve transportation. He stated that the automotive industry was composed of real live men who knew the facts. In this connection he referred to the address last year in which Mr. Graham, coming from the automotive industry, held out open arms to the electric railways and offered to help them in any way possible. Mr. Barnes went on to say, "We took our heads out of the sand then, but we've stuck them back in again now."

Unorganized jitney buses have done much in many communities to damage the prestige and decrease the profits of street car lines. If this is the case properly organized and efficiently operated bus lines

will surely do more damage. And these bus lines are coming. Therefore, where bus lines are practicable it would seem obvious that there are only two courses of procedure open for the street car line in certain cases, either to organize and operate the inevitable bus lines themselves or go out of business.

From the views held by the representatives of manufacturers present at the convention it would seem that there is a strong inclination on their part to recommend the use of present standard equipment for buses.

Chassis Offers Problem

The attitude of the manufacturers is perfectly comprehensible. The exact specifications of the vehicle most suitable for city bus work have not yet been determined. It is not known what type of chassis will be demanded of them by the street railways which buy and operate buses nor is the extent of that demand known. To construct a chassis which will be ideal for city bus work will mean much research and designing effort and possibly the installation of additional machinery to manufacture the

final design. It is natural that the manufacturers are reluctant to undertake this work without any knowledge of the extent of the market on which they can depend for the sale of the ideal vehicle when it is completed.

On the other hand there are some who hold that the truck chassis is not suitable for the best type of city bus transportation. They hold that the high center of gravity increases the danger of overturn, also that the height of the body on the truck chassis makes it inconvenient for the passengers to board and alight from the vehicle. And there are other doubtful features. As an example of this it is reported that a truck chassis of a prominent and reliable make was recently tested out in city bus work by a large bus company. The bus had already made a trans-continental trip, but was in perfect condition and was driven by a representative of the manufacturers. At the end of a week the clutch, the brakes and other parts of the vehicle are reported to have failed under the constant strain of stopping and starting in traffic and the vehicle was practically useless.

But the bus is coming. The ideal type of bus chassis is coming also and will survive.

S. A. E. Standards Work in Progress

THE Society of Automotive Engineers has been requested to formulate a standard for wing nuts in order that designers may refer to a standard list and select sizes which may meet their requirements.

As it is recognized that the formation of such a standard should be based on the best present practice the S. A. E. is obtaining data on current practice for the different types of wing or thumb nuts and those standards which are in general use by small industrial groups such as bolt and nut manufacturers.

The adoption of a standard series of wing nuts will do much to decrease the cost of certain wing-nut sizes through greater production and will ultimately result in discontinuing many special sizes.

Makers May Standardize Clutch Facings

A. C. Bryan, vice-chairman of the Transmission Division, has submitted a preliminary recommendation for S. A. E. clutch facing standards based on present practice. This recommendation will be thoroughly discussed and, if possible, finally acted upon at the fall meeting of the Transmission Division.

It is believed advisable to divide the facing sizes into two divisions—one for single plate and the other for multiple plate clutches. The majority of single-plate clutches seem to be made in three sizes, 8, 10 and 12 in., and in view of the fact that they are quite similar in design and are housed by flywheels bored 8, 10 and 12 in. respectively, it would appear that a standard inside and outside diameter can be agreed upon without running into much opposition from the clutch makers, as these sizes will fit into their present clutches without any change in the design of the clutch parts.

A great number of multiple-disk clutches on the market are so varied in design that it makes the question of standard facing sizes for this type somewhat more difficult than in the single-plate clutch, but it is believed that the many sizes of facings now used can be reduced to a comparatively few if the matter is studied by the S. A. E.

It is generally recognized that one of the most effective ways of identifying stolen automobiles and minimizing the danger of their being stolen in the first place would be

the general adoption of a method of numbering engines which would make it impossible to change the numbers without leaving indications that a change had been made.

Replies to a letter from the S. A. E. Standards Department soliciting advice from automobile manufacturers on this problem indicated that the stamping of plain characters on several parts of the engine and other units of the chassis is the most satisfactory way of guarding against having the numbers changed by automobile thieves. It is realized, however, that if a simple means of numbering cast-iron or aluminum castings can be discovered which will make it difficult for the numbers to be changed, it would be a real solution to this problem. The suggestion has been made to the S. A. E. that a solution might be found by the casting of a special alloy block in the surface of that part of the engine casting which is to be numbered, the composition of the alloy being such that it would be impossible to change the numbers by any simple means. The selection of such a material would depend, of course, upon its physical characteristics. Members of the Iron and Steel Division have been asked to study the possibilities of this solution.

Any suggestions in this connection which might be developed into a satisfactory means for numbering engines should be referred to the Society.

Tractors and Trucks in Morocco

ACCORDING to the French trade organ, *Exportateur Français*, there is a good scope at Morocco for tractors and trucks, a reason assigned being the absence of coal, and therefore lack of railroads.

The British Consul General at Beirut, Syria, pays a tribute to the enterprise of American auto firms in that territory. American cars, he says, greatly predominate because of being cheap, light and powerful to climb the stiff grades, whereas the cheaper British cars fail as hill-climbers, and dearer ones are either too expensive or too heavy. Trucks and vans, he says, have a good scope about Damascus and Beirut, where the merchants find it cheaper to use the roads in preference to the railway, the latter having inadequate carrying capacity.

Exports of Automobiles and Tires for August, 1921

COUNTRIES	COMMERCIAL				PASSENGER				Parts	TIRES			All other Tires	
	Complete Cars		Chassis		Complete Cars		Chassis			For Automobiles				
										Casings	Inner Tubes	Solid Tires		
EUROPE														
Austria.....					10	\$5,360								
Belgium.....					31	23,431	25	\$9,381	\$4,961	\$3,143	\$35			
Denmark.....	1	\$2,164			6	5,882			112,581	31,812	6,682	\$352		
Estonia.....					1	2,106								
Finland.....									928	36,000				
France.....					9	20,713			9,805	21,105	1,336			\$99
Germany.....							1	1,820	164	28				
Gibraltar.....					1	800			3,767					
Greece.....									949	2,028	87	217		
Iceland and Faroe Islands.....									362					
Italy.....					1	5,000			1,455	101	14			
Malta, etc., Islands.....									483	243				
Netherlands.....	25	12,567	2	\$866	48	34,799			8,752	4,985	70	148	222	
Norway.....			9	8,367	2	880			11,985	13,270	1,017	3,418		
Jugoslavia, etc.....					14	11,277			550	4,000		1,037		
Poland and Danzig.....					4	1,500			3,359	1,336		6,000		
Portugal.....									2,250	987	38			
Roumania.....					1	1,250			2,099	26,388	5,007	1,833	1,347	
Spain.....					7	7,348			9,767	9,111	10	308	6	
Sweden.....					56	54,514	1	1,456	9,206	30,501	472	2,055		
Switzerland.....					14	16,804			5,943	1,759	107			
Turkey in Europe.....	4	16,000			1	1,800			4,943	749	484			
England.....	37	66,289	12	15,480	11	11,726	25	28,711	154,656	358,002	36,190	15,236	59	
Scotland.....					1	1,500			1,525	698		288		
Ireland.....									35					
North and South America														
Bermuda.....												76	80	
British Honduras.....													98	
Canada.....	50	70,158	39	70,641	693	809,583	12	20,875	832,940	73,646	18,459	19,720	833	
Costa Rica.....	2	4,062			5	5,752			500	227		193		
Guatemala.....					9	14,338			2,526	2,287	362			
Honduras.....			1	556	4	4,950			2,857	2,927	388			
Nicaragua.....									485	284	20			
Panama.....					22	21,255			4,230	9,281	471	80	241	
Salvador.....									1,058	2,791	309	191		
Mexico.....	98	75,831	33	17,820	564	497,279	30	8,538	119,884	84,100	8,989	2,291	11,560	
Newfoundland and Labrador.....					2	7,392			1,865	840	92			
Barbados.....									2,301	1,443	227			
Jamaica.....	2	956			5	3,685			8,938	10,858	629	1,171	241	
Trinidad and Tobago.....	6	3,587			8	4,168			8,064	7,076	725	428	150	
Other British West Indies.....	2	3,250			6	4,156			852	181	85		100	
Cuba.....	2	1,836			81	73,336	4	2,912	53,455	37,310	6,773	20,503	2,542	
Virgin Islands of U. S.....					6	5,000			2,432	1,877	403			
Dutch West Indies.....									900	2,383	172			
French West Indies.....									665	38	150	55		
Haiti.....									2,062	3,275	319		5	
Dominican Republic.....					4	1,670			4,762	8,958	1,202	227	651	
Argentina.....									47,535	34,988	7,474	203	2140	
Bolivia.....									1,683	117				
Brazil.....					7	16,900			3,665	5,739		3,245		
Chile.....	8	3,824	1	1,072	3	4,460			7,530	3,722	367	148		
Colombia.....	1	1,817	1	480	4	2,640			10,014	5,112	303	680	210	
Ecuador.....									205	3,016	398			
British Guiana.....									1,777	121	42	125		
Dutch Guiana.....									141					
Peru.....					2	4,805			7,163	11,720	199	340		
Uruguay.....					1	4,500			9,883	5,818	546			
Venezuela.....					21	23,071			9,786	5,977	980			
Asia														
Aden.....									68	854	79			
China.....					22	35,585			9,856	7,944	112			
Chosen.....					2	1,200								
British India.....					23	12,736			19,317	160		4,472	150	
Straits Settlements.....									6,615	2,344	233	1,636		
Other British East Indies.....									5,661		506			
Dutch East Indies.....					117	120,903			36,895	19,842	1,486	5,235		
Greece in Asia.....									425	466	199			
French Indo China.....									116	648				
Hejaz, Arabia, etc.....					9	6,431			2,351	1,164	149			
Hongkong.....					3	5,500			18,594	6,012	15	885	280	
Japan.....	2	4,350	13	17,412	28	31,122			9,972	3,860	838			
Palestina, Syria.....					16	16,190			11					
Russia in Asia.....					6	3,600			567				32	
Siam.....									137					
Turkey in Asia.....					37	49,603	125	104,682	53,226	5,411	436			
Australia.....			1	2,335	15	22,975			41,685	32,684	1,261	6,258		
New Zealand.....	1	2,000	2	5,200	3	2,424			365	208	47	79		
Other British Oceania.....					2	2,066			875	906	139	96	339	
French Oceania.....					2	1,390			351					
Other Oceania.....					2	3,520			10,193	12,380	4,303	13,438	946	
Philippine Islands.....														
Africa														
Belgian Congo.....			10	4,784	5	2,165			1,019					
British East Africa.....			9	13,365					9,393	6,759	1,051			
British South Africa.....					28	32,885	1	2,575	33,642	11,588	786			
British East Africa.....			1	3,000	4	6,936			7,832	4,681	587	309		
Canary Islands.....			1	1,592					505					
French Africa.....									233	225		60		
Morocco.....			5	2,391	20	9,815	4	1,732	8,647					
Portuguese Africa.....									830			146	7	
Egypt.....									8,470					
Total.....	241	\$268,691	140	\$165,361	2,009	\$2,082,646	228	\$182,682	\$1,786,886	\$992,123	\$114,074	\$113,184	\$22,338	

Bright Future Predicted for U. S. International Trade

Speakers at American Manufacturers Export Association believe exchange situation will be remedied slowly but surely. Danger of German competition is overrated. Many expressions against the proposed tariff were in evidence at convention. European imports needed to start trading.

THE chief interest to the automotive industry in the annual convention of the American Manufacturers Export Association, held in New York City during the first week in October, was the universally expressed conviction that foreign trade, although it totals no more than 10 to 20 per cent of our total business, is essential to the return of prosperity to the United States. With this belief was coupled a general feeling that our overseas business has passed its lowest point and that a trade revival may be confidently expected in the coming months. The recovery, of course, will not be sudden and it will not come as a boom, but, nevertheless, better conditions in this part of our business are on the way.

The association is a general one and numbers among its thousand members manufacturers of all classes of goods suitable for the export trade. Among these are automobiles, trucks, equipment and other products of the automotive industry, many firms of which are members of the association. Consequently, the gathering brought together a number of export representatives from the industry, although, unfortunately, no part of the program specifically considered the automobile and its place in our foreign trade. However, the association recognized the growing foreign position of the industry by electing J. Walter Drake of the Hupp company, chairman of the Foreign Trade Committee of the N. A. C. C., as a director.

Delegates and speakers at the convention were chiefly concerned with three things. These were international credits and financing, which included the exchange situation; the proposed American tariff changes, and the better tone prevailing and predicted for our overseas trade. As to the first, it was generally agreed that events would have to take their course and that the correction or stabilization of exchange depended upon many factors. Par value for many foreign currencies cannot be expected for many years, and, in the words of more than one speaker, the present monetary units of some may fall by the wayside to be replaced by other standards. Stabilization, through mutual and co-operative efforts by the great banks of issue of the United States, England, France, Italy, Holland and Spain, was given as a possibility by Secretary Hoover, who addressed the annual dinner, and it was hoped by him that some method might be worked out which would do away with the recent violent week by week fluctuations that have been so characteristic of certain divisions of the exchange market.

The proposed tariff was not popular with the members of the association. No more so was the American valuation plan. Only one speaker favored the changes

that Congress has proposed and he was greatly outnumbered by others throughout the meeting. The position was made clear by James M. Anderson, Jr., of the Chase National Bank of New York, in considering the possibility of the dumping of low-priced goods from Europe or other sections. He said:

"Many American manufacturers are apprehensive of European competition, notably from Germany, and they are urging that high tariff barriers be erected to prevent the influx of foreign goods. During the first eight months of 1921 Germany sent us \$52,000,000 worth of goods and took from us \$263,000,000. There is nothing in these figures to suggest a very imminent danger. But the most welcome thing that could come about, the thing that would promise for a real revival, would be a real and vigorous increase in imports to the United States of European manufactures. It would start the circle of trade going again."

This position was recognized even by Senator Walter E. Edge, the New Jersey representative in the Senate, who is best known for the bill bearing his name that authorized the formation of foreign trade financing banks. Senator Edge stated that he favored protection, but that Europe must send goods to the United States in order to restore her financial and industrial status. He proposed that the tariff act give broad discretionary powers to the President to control various schedules. The President, with the possible assistance of the Secretary of the Treasury and the Secretary of Commerce, would be authorized to regulate the rates to protect any American industry threatened by low-priced, foreign-made goods.

Hoover Predicts Price Stabilization

Secretary Hoover declared that European competition of low-priced products could not be continued long. The same economic factors were at work throughout the world, he said in substance, and that would bring about a condition of more stabilized prices. He was distinctly against any belief that Germany has achieved a solid foundation in her present show of feverish prosperity and believed that the continued inflation of the mark will ultimately cause a sharp turn in the minds of those who fear German competition.

This competition was also a subject that engrossed the delegates, many of whom were at a loss to know just how strong a position Germany had obtained in her former foreign markets. Unfortunately, few direct references to this were made by the speakers. The attendants, however, were unusually frank in declaring that German competition had been greatly overrated in the general markets and that American manufacturers

could compete on price to-day in a majority of the world markets.

George Weston, general manager for South America of the American Express Company, made this an important point in his talk at the luncheon on the opening day. With specific reference to textiles, he related an experience during August with three textile salesmen from the United States in his office at Buenos Aires. These men, he said, were confident that they could compete on price, service and delivery with their lines, provided Argentine exchange went no lower than it was at that time. Weston then showed that the Argentine currency had appreciated materially since the conversation referred to and, consequently, orders for textiles, hardware and other lines were again being booked.

The South American Market

Weston was one of the few speakers whose talks carried an intimate and recent knowledge of particular foreign markets. He has just completed a ten months' visit to Brazil, Uruguay, Argentina and Chile, and has unbounding confidence in their fundamental strength. In Brazil, he said, the shelves of interior stores are almost bare of all goods, and, as a result, inquiries are coming to the larger centers that will result shortly in new business and further liquidation of whatever stocks are held in the customs houses. Brazilian merchants have been hard pressed, although an improved condition is already apparent, and he counseled that all credit risks to that country should be carefully scanned.

Argentina and Uruguay were looked upon by the speaker as offering more immediate business. With general betterment expected by their bankers and business men, Weston said that he would not be surprised to see our trade improve rapidly with those two countries. The last year crops in Argentina have now been sold and anxiety as to the wheat production for 1921 has been allayed by recent rains. Chile was pointed out as presenting a condition similar to Brazil. The demand for nitrate had dropped almost to nothing, but there now are "evidences that this nitrate stagnation cannot con-

tinue much longer and Chile will again come into her own."

Another important subject covered by Weston was that of credit allowances.

"The day of cash against documents at New York has passed," he said. "Fortunately the Germans have not reverted to their old methods of extending credits for periods of six months, a year or two years, but all of the Europeans are quoting 60-, 90- and 120-day terms. We must meet these allowances if we are to do business.

"On prices we are to-day doing business in many lines and new orders are being placed. The quality of goods from Europe is generally lower than from this country and this is being recognized. The only things I have to deplore in regard to our foreign trade are the lack of perseverance and the lack of knowledge as to South American needs of many of our manufacturers."

The picture of Europe, as given by several speakers, was both bright and dark. The latter was almost entirely one of finance, whereas it was conclusively shown that great strides had been made since the armistice in restoring the economic and social structure of a majority of the continental countries. Secretary Hoover was one who has been greatly impressed by the forward movement of Europe in this regard. Another was John S. Lawrence of Lawrence & Co., Boston, who summed up the European situation by saying that the continent had made a steady improvement in industry and agriculture but had steadily declined on the financial situation.

This brought up the reparation payments by Germany, which was a recurring subject for discussion. Several speakers recognized that the United States should have some part in the reparations deliberations. W. F. H. Koelsch of the New Netherland Bank of New York, whose paper was read, expressed the possibility that the allied leaders in Europe might propose some change in the payment system instead of having such a request come from Germany.

Myron W. Robinson of the Crex Carpet Co., New York, was elected president of the association to succeed William C. Redfield, former Secretary of Commerce.

New Theory of the Slotted Wing

IN a paper recently read before the Society for Aeronautical Science at Munich, Dr. Betz dealt with a certain development in sustaining planes or aircraft wings due to Lachmann in Germany and Handley Page in England. The object is to increase the lift by providing slots in the wing parallel to the leading edge. If these are to be effective they must extend without interruption across the entire width of the wing. This arrangement may also be regarded as an extra plane of small depth placed in front of the main wing at its leading edge so that there is only a very small space left between the two. The maximum lift of the plane is thereby increased by 80 per cent or more. There are different explanations of this phenomenon. One is that the small plane located in front of the main plane is located in an air stream whose conditions of flow are determined by the main wing. It follows that at the leading edge of the main wing the air speed materially exceeds the speed of flying. The reactions of the air on the small wing in front therefore are considerably greater than if it passed through space at the flying speed.

The new explanation of Dr. Betz is based on the fact that for a given speed the lift of a plane increases with the angle of incidence until the air stream on the upper

surface can no longer follow that surface. If the angle of incidence becomes too big, a new condition of flow develops, the air stream separating from the plane, creating a field of eddies which grows with the angle of incidence. Such eddies have a tendency to form even in the case of small angles of incidence, but the air, passing over the plane, immediately washes them away, and thus maintains a smooth, lift-creating stream. In the case of large angles of incidence this becomes impossible. But if the air stream on top of the plane is reinforced by air passing through the slot in the wing from the under to the upper side, the lift-creating flow conditions can be maintained even with larger angles of incidence. New energy is being supplied to the air stream on top of the plane by the air flowing through the slot, which enables it to continue to wash away the eddies. This energy has to be paid for, however, the phenomenon being accompanied by increased drift of the slotted plane as compared with a plane without slot.

This new explanation is valuable for the reason that it furnishes a basis for judging the value of new plane combinations of the kind referred to, and facilitates the arrangement of systematic test series in a field where the number of possible combinations is almost without limit.

The Purpose of the Labor Articles in AUTOMOTIVE INDUSTRIES

Mr. Tipper, in this article, points out the necessity for studying the human side of production activities with a view to preventing trouble rather than waiting for difficulties to arise and then attempting to find a remedy. Production cost depends largely upon human organization.

By Harry Tipper

SOME of the subscribers of AUTOMOTIVE INDUSTRIES who favor me with their constructive criticism of these articles, have asked me of late why the continuing of the labor articles, now that the labor problem has passed. This is a reply to those questions, mainly for the purpose of clarifying the problem which faces industry and showing the imperative necessity for studying the human side of the case, at least as carefully as we are studying the mechanics.

The labor disturbances which were so violent in 1919 and the early part of 1920 have subsided to a very large extent. Strikes are no longer occurring with the same frequency. Grievances are being adjusted where there was no basis of adjustment previously. These things are true sufficiently to remove the problem of human efficiency from among the visible problems before the manufacturer. The manufacturer is now more concerned with the production costs because of the declining prices he is obliged to face.

It is important that the significance of this situation be thoroughly understood. Prices have declined materially from last year and these new prices have been arranged largely for the purpose of meeting market conditions and are not particularly related to the costs of production. The authoritative economists are almost a unit in declaring that for a number of years there will be a general tendency for prices to decline over the surface of industry, although this will not apply to all industry to the same degree, nor will it be true without intervals of increasing prices from time to time.

Necessity for Lower Costs

However, the best information on the economic situation indicates a necessity for lower costs. These lower costs must come out of the production of the product, or the commercial branches and marketing necessities of the same product. It is probable that the increased efficiency will have to be secured from all departments of the business, that production methods must be improved, and production costs reduced per unit of goods, and also marketing methods be improved and marketing costs be reduced per unit of sale. The mechanical fabric of industry is too great and too complete in its character and subdivision to be improved very rapidly in itself.

It is worthy of note that in all reports of the Waste Committee of the American Engineering Council, the large percentage of the waste is due to human inefficiency, the costs of human neglect and the results of human failure.

In every industry in the country these costs represent a larger total than the lack of balance in the mechanical fabric and the possibilities of immediate improvement in the character of the mechanical equipment.

Events have shown that it is not possible to figure on a certain efficiency of labor on the average, as the efficiency fluctuates with the conditions of employment and the character of industrial development. The problem, therefore, is one of harnessing a larger part of the potential capacity of the individual human being to active and continuous service in the production of commodities.

William James pointed out a good many years ago that only from 40 to 60 per cent of the intellectual capacity of the average individual was put to work. The only failure of that estimate is that it is too high. The potential capacity of the average intellect for judgment, accuracy and order is very much greater than the expressed skill of the same intellect and the expressed skill is the only part that can be applied to the job.

This problem of harnessing a larger part of the average capacity of the man to the job is not a theoretical one. It does not bear any relation to those academic researches which are concerned with the general development over periods of generations and do not appeal to the business man, who is immersed in the development of product for the immediate future and for his own generation only.

Individual Efficiency Helps

The organization which is able to increase the individual efficiency to a fair degree is in a better position to withstand the stress of competition than that organization which has neglected the human side of the question. The severity of competition is increasing, because the manufacturing capacity is larger than the absolute requirements and this competitive intensity will demand an analysis of cost very much keener and more accurate than our previous analyses. It will require a much closer study of the factors that enter into the costs, and how these factors can be influenced. Labor disturbances may have ceased to operate as a visible problem for the time being, but the problem of putting the human potential capacity to work is so far from solution and so necessary a matter of study, that it must be considered with the same care now given to the mechanics of production and the elements of salesmanship.

These articles have missed their purpose and shot very wide of the mark if they have failed to indicate that the question of strikes or group disturbances is only

one symptom of the problem and not the reason for considering it.

No engineer worthy of the name would defer his study of mechanics of production until the machinery of the factory broke down, and then begin a hurried attempt to find some way to make it work again. Every item of this mechanical production is analyzed sufficiently to enable the manufacturer to depend upon keeping his plant going with fair regularity, with little lost motion and with a fair dependability of result.

The same manufacturer does not consider the human problem until the system breaks down and the men refuse to work. In fact, many manufacturers are inclined to wonder why the problem should be discussed so long as the machinery of human group organization does not entirely break down and leave them stranded.

Behind the present engineering skill and expressed efficiency there are a hundred years of development in the practice of mechanical equipment and the study and improvement of machinery.

The bibliography of works on production from the mechanical side runs into thousands of books and presents a wealth of detailed consideration from which the student can learn the past experience in all kinds of manufacture.

No such background is to be found in the case of the human being in industry. Books on organization have not dealt with human organization, but with systems of controlling human organization. Books upon management have dealt very rarely with the development of men, but very frequently have enlarged upon the systems of centralized instruction and control by which men can be made to do as they are told.

All through this history of production there is an absence of consideration for the human factors in production, which is as illuminating as it is disturbing.

With so little background for study, it is difficult for the average man to conduct researches into the subject. Most men in their study have been accustomed to have their subject separated from the rest of the fabric of industry, carefully analyzed, and dished up, so that they would not have to search through innumerable volumes to find it out.

It is not possible to do this in connection with human matters. Books which would suggest factors of importance in human growth are classed under many subjects in the libraries and called by many names by the publishers. It is necessary to read a number of books in order to get one clear suggestion. Consequently, the average man, who is busy with the operations of the plant, finds it impossible to carry his studies of this subject very far. He cannot spend the time in reading books which are so far away from his practical operations in order to find a suggestion that he may use. His mind is occupied by his practical responsibilities, so that the suggestions would pass unnoticed most of the time, because they have not been applied to his particular case.

It is important, therefore, that the student who has been able to conduct such analysis and research should present his conclusions, refer to his authorities, consider the practical experiments, and draw the principles and fundamentals from his wide consideration and experience with the needs of the busy man in mind. This service should be performed continually, because only by that means can the subject be opened up and applied to the manufacturing necessities.

The big problem before the manufacturer to-day is how to reduce costs. The production costs must be reduced along with the other costs. How to reduce these costs and to retain the efficiency or to increase it, are the important elements of the problem. The problem cannot be solved by merely reducing the activities. It may be solved by increasing the activities through the reduction in the cost of the individual unit, and this means an increase in the efficiency of work upon each unit.

Because so much of the waste is the waste of human capacity, the problem of production costs is very largely a problem of human organization, and this is developed from an understanding of human necessities.

This is not a job to be done by a half hour's discussion or a little ginger talk. It must be studied and experimented with carefully and continually. Hence, these articles and their continuance when there is no visible labor disturbance and there appears to be no particular difficulty on the horizon in connection with the skilled or unskilled labor portions of the human organization within the factory.

Unemployment in Great Britain

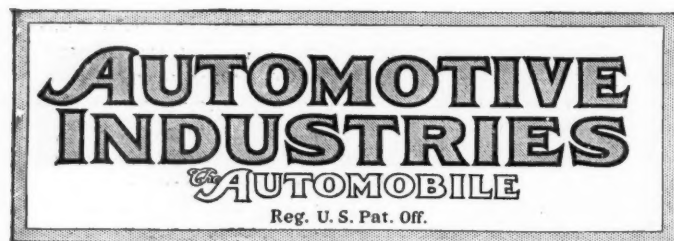
THOUGH there is much dispute—and with fair reason—concerning the English Government's periodically issued figures as to the cost of living in Great Britain, there is no challenge to the data concerning wage revision and number of unemployed. In August, 3,160,000 persons had a revision of wages; of which 3,070,000 suffered a reduction and nearly 90,000 received an increase. The gross reduction on full time wages was about \$3,500,000, made up of rates ranging from 2 cents per hour (47-hour week) for most trades, up to 72 cents per week for day-rate metal trades workers and 7½ per cent for metal trade piece workers.

Unemployment among the trade unions fell from 16.7 per cent at the end of July to 16.5 per cent in August, the total of unemployed registered at the labor exchanges on August 26 being approximately 1,573,000 persons, of whom 1,190,000 were men. A bad feature about the unemployment figures is that a vast number of persons have exhausted the period during which they were entitled to

State aid. They have now to qualify for a further period by being out of work a number of weeks. Meanwhile they have to be supported and, at present high cost of living, obviously the task is unusually difficult. Terms offered by the Government for municipal aid in road making and improvements have been rejected by local authorities as demanding too high a rate of interest.

It may be noted that in the automobile works labor of the skilled sort (fitters and turners) in Britain is averaging 45 cents per hour for 47-hour week, but Ford workers receive a uniform rate of 52 cents per hour besides a yearly bonus plan.

A BOOK containing petroleum laws governing leases, concessions and explorations in all the countries of North, South and Central America has been compiled by the Bureau of Mines in Washington. Included in the collection is the leasing act enacted by Congress and the petroleum laws of the various states in this country.



Reg. U. S. Pat. Off.

PUBLISHED WEEKLY

Copyright 1921 by The Class Journal Co.

Vol. XLV

Thursday, October 13, 1921

No. 15

THE CLASS JOURNAL COMPANY

Horace M. Swetland, President
 W. I. Ralph, Vice-President E. M. Corey, Treasurer
 A. B. Swetland, General Manager
 U. P. C. Building, 239 West 39th Street, New York City

BUSINESS DEPARTMENT

Harry Tipper, Manager

EDITORIAL

David Becroft, Directing Editor
 Norman G. Shidle, Managing Editor
 P. M. Heldt, Engineering Editor
 Herbert Chase
 Floyd E. Williamson

DETROIT OFFICE
 J. Edward Schipper

WASHINGTON OFFICE
 816 Fifteenth St., N. W.

BRANCH OFFICES

Chicago—Mallers Bldg., 59 East Madison St., Phone Randolph 6960
 Detroit—317 Fort Street, West, Phone Main 1351
 Cleveland—536-540 Guardian Bldg., Phone Main 6432
 Philadelphia—1420-1422 Widener Bldg., Phone Locust 5189
 Boston—185 Devonshire Street, Phone Fort Hill 4336

Cable Address.....Autoland, New York
 Long Distance Telephone.....Bryant 8760, New York

United States and Mexico.....One Year, \$3.00
 Extra postage west of the Mississippi River on account of Zone Postage Law, 0.50
 Canada.....One Year, 5.00
 Foreign Countries.....One Year, 6.00

To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order or Register your letter.

Owned by United Publishers Corporation, Address 239 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; A. C. Pearson, Treasurer; Fritz J. Frank, Secretary.

Entered as second-class matter Jan. 2, 1903, at the post-office at New York, New York, under the Act of March 3, 1879.

Member of Associated Business Papers, Inc.

Member of the Audit Bureau of Circulations.

Automotive Industries—The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly) July, 1907.

Headlamp Lenses with Key Slots

THE majority of the special lenses used on headlights with the object of reducing the glare act on the principle of the prism, the rays of light being turned downward by refraction in passing through the lens. In order that such lenses may perform their function efficiently they must be held in the lamp shell in a definite position; if they should turn around their axis to any appreciable extent they may fail to accomplish their purpose and even be a positive detriment.

So far the friction between the lens and the lamp shell has been depended on to keep the lens in the position in which it is placed when fitted. It has been proved by experience, however, that this method of holding is not reliable, especially in the case of lamps on the cheaper grades of car, which lamps are generally made of very light stock. In the course of operation the lens will shake loose and is then very apt to turn around. As this is a matter which does not materially affect the operation of the car, and as the driver feels that he is complying with

the law if he has his lamps fitted with one of the types of approved headlamp devices, it is likely to be neglected, and hence the intent of the law with respect to glare elimination is defeated.

The remedy for this difficulty is obvious. All that is necessary is to provide the lens with one or more keys or key slots and the lamp shell with corresponding members. The matter has been taken up by the Standards Committee of the S. A. E. Once the locking means has been standardized, the lens makers can go ahead and change their molds with the assurance that lenses from these molds will fit any lamp of the corresponding size, and this particular difficulty will be eliminated.

Building Foreign Confidence

DESPITE scientific theories as regards salesmanship, personal contact plays an important part in modern business. Advertising has a definite function in the selling scheme, but it must be backed up by personal visits by salesmen. These personal contacts do more than get business; they make possible the establishment of close business friendships and make it easier to build up mutual confidence between buyer and seller. Such confidence means an actual reduction in selling costs.

In merchandising automotive products to foreign countries, however, this personal contact is usually difficult and often impossible to get. Consequently, the building up of confidence is a more difficult matter than in domestic business. Sharp practices in domestic business will finally ruin any confidence that may be built up, but the personal contact that is possible will usually prevent misunderstandings.

In the case of foreign business, however, even the appearance of evil is especially to be avoided. It takes letters a long time to reach their destination, and it takes a long time to overcome an unfavorable impression that may arise through misunderstanding. Putting aside national pride for the moment, it is undoubtedly true that the handling of our foreign automotive business in the past has not always been such as to tend toward building up confidence in American methods.

An instance is related in which a representative of an American car manufacturer in China told a Chinese merchant that in order to be sure of getting 10 cars a month he should contract for 100 a month. The transaction took place during peak production times, and the salesman told the Chinese merchant that his American factory was so hard pushed to supply cars that it supplied only about 10 per cent of every order which they got. The Chinese merchant took the word of the salesman concerning this practice and ordered accordingly. He received no cars at all for some eight months. Then the slump in the American market came. The Chinese merchant then received a shipload of 600 cars in one lot. Naturally he was unable to pay for them and could not sell them. As a result these cars are probably on some Chinese dock at the present time.

While such practices are not, of course, common among automotive exporters, the example cited is a

striking, though exaggerated, illustration of how the confidence of foreign buyers may be broken down. This one experience probably created a prejudice against American methods among all the Chinese merchants with whom this particular merchant has since come in contact. For, just as we are likely to judge the practice of an entire country by the actions of the individuals with whom we have dealt, so the foreigner is likely to judge American standards of practice in the same way. The justice of such judgment may be questioned, but the fact remains.

In handling foreign business extreme care is necessary, even in small matters, to make certain that there is no opportunity for misinterpretation or misunderstanding. Practices understood at home may not be understood abroad.

Motor Buses in America

ANY intelligent analysis of the transportation system in this country must recognize the importance of the motor bus as an important potential factor in solving the problems presented. The development of both city and interurban bus lines in England strikingly illustrates the scope of the motor bus in an economically sound solution of transportation problems.

There are even greater possibilities for a similar development in this country, so that the motor bus field is a potential market worth the attention of truck manufacturers. In considering this market, however, many variable factors confuse the situation at present. On the commercial side, it is not yet clear what agencies will be the most important in developing bus transportation and consequently in buying buses.

The existing transportation interests may realize possibilities of the bus as an ally. They may install and operate bus lines in connection with their present services, strengthening and substituting as the transportation economics of the individual situation dictate. It was largely along these lines that the English development took place, and there is some evidence of similar action in this country. On the other hand, the spirit of opposition to buses may prevail among existing transportation agencies, in which case bus development may be through municipalities or independent bus line operators.

Sufficient progress has not yet been made to determine what lines the major development will take in the United States. The potential market for buses is undoubtedly present; the concrete market must be studied very carefully.

But motor bus development will depend largely upon engineering as well as commercial developments. Many engineers who have studied the problem carefully are of the opinion that the standard truck chassis is not suitable for motor bus work. The ability of the engineers to modify or redesign the truck chassis for bus service and the willingness of the truck manufacturers to make this special design are large factors in the future of bus development.

Every truck chassis which fails to perform effi-

ciently and economically when used as a bus adds just so much resistance to the rapid development of a potentially profitable market. Every chassis which enables the operator to make a profit and the passenger to ride in comfort at a reasonable price hastens the development.

While it is not always possible to adjust immediate efforts exactly in line with permanent development, the various factors mentioned should be seriously considered in marketing efforts of this kind.

Tractor Dynamometer Trials

FOR some years the question has been discussed in tractor circles whether scientific tests in connection with tractor demonstrations would not prove of help to the industry. It was realized some time ago that the mere demonstration had practically played out as an attraction to the farming community, and if the tractor industry was to be further promoted by field demonstrations, accurate measurements of drawbar pull, drawbar horsepower and fuel consumption must be made, so that data could be put into the records which would bear weight with prospective purchasers.

During the past year excellent data concerning American tractors have been furnished by the official tests of the University of Nebraska. As it is impossible for a tractor manufacturer to sell his machines in Nebraska without first submitting them to these tests, practically all tractors now manufactured in this country have been tested at Lincoln, and as the results are available to the general public the need for such tests at tractor demonstrations has been eliminated. It is more than likely, however, that if dependable tests had been carried out at the national demonstrations some years ago the Nebraska tractor law would never have been adopted.

In England the need for serious scientific tests in connection with public trials has also been felt, and at the trials recently held at Shrawardine every tractor was given a six-hour test with a traction dynamometer. An endeavor was made to obtain data bearing on the relation between the maximum obtainable drawbar pull and the weight on the drivers. This is a very important factor in tractor design, because the drawbar pull is one of the factors which measure the working capacity of the tractor and if a given drawbar pull can be obtained with less weight, the over all efficiency of the tractor can be increased. It is readily realized, however, that the ratio referred to depends not only upon the nature but also upon the condition of the soil. Its value is naturally smaller when the soil is wet than when it is dry. It so happened that during the Shrawardine trials the soil was quite dry, yet the drawbar pull of thirty-six out of thirty-eight machines was limited by the adherence of their drivers and that of two only by the engine power. It might have been expected that if any type of tractor would stall its engine under excessive loads, it would be the chain-track type, because of the admitted better adherence of this type, but as a matter of fact the two tractors that stalled their engines were of the wheeled type.

N. A. C. C. Discusses Dealer Problems

Car Makers Urged to Give More Help

Used Cars, Financing and Contracts, Subjects Considered at Their Annual Meeting

NEW YORK, Oct. 10—One of the greatest problems confronting the automotive industry is found in the relation between manufacturers and dealers. This fact was recognized at the annual members' meeting of the National Automobile Chamber of Commerce here last week when practically the entire session was devoted to consideration of various phases of the subject.

Difficulties Not Minimized

The convention was attended by more than 100 factory executives who made no attempt to minimize the difficulties involved in finding a market for used cars, financing dealers and meeting dealer requests for contract changes.

The great volume of used cars on the market was held to present the most difficult obstacle to continued sales of new cars in large volume. The most concrete proposal in this connection was that manufacturers should study not only the market for new cars but for used cars and govern their production accordingly. It was apparent, however, that no concerted action can be expected along this line and that it will be up to each individual company. Some of them seemed to feel that there was plenty of demand for their output, but that some of the other fellows should limit theirs.

Some Companies Assisting

In fact, as the discussion continued, it became clear that no uniformity of action in relation to any of the big problems of the industry is likely at this juncture. Each manufacturer will study his own resources and his own needs and act accordingly for the benefit of his dealers. Those who can help them to help themselves probably will do so, but it was the view of the majority that the manufacturers have troubles of their own and that they should not be expected to assume the burdens of their dealers. They held that in the dealer end of the industry there should be a survival of the fittest and that those who are not good business men or who have scant financial resources of their own should be eliminated as rapidly as possible.

It was brought out that several companies have been assisting their dealers by helping distributors carry stocks or handle dealer paper. This disclosed what

appears to be a steadily increasing sentiment in favor of eliminating distributors if they are not strong enough to finance themselves in favor of a system where all dealers will work under the direction of factory branches or regional factory warehouses.

There was a feeling that companies which are in a strong enough position to do so should assist dealers in paying the carrying charges of some reputable financing company to handle vehicles actually on their floors.

The manufacturers were willing to assist in every way in their power in selling bankers throughout the country on the essentiality of the motor car and thereby inducing them to assume a more liberal attitude in regard to dealer paper. It was felt that the recognition given the industry by the big bankers of New York and other large cities would have a beneficial effect.

Financing of dealers was considered even more intensively by the truck manufacturers than by those in the passenger car field. They listened to addresses on this subject by J. H. Shale, vice-president of the Bankers Commercial Security Corp., and John J. Schumann, Jr., vice-president of the General Motors Acceptance Corp. Both spoke along the same general lines.

(Continued on page 747)

Carter Motors Formed with \$2,000,000 Capital

WASHINGTON, Oct. 10—Incorporation of the Carter Motor Car Co. with a capitalization of \$2,000,000 has been announced here. The company was incorporated under the laws of South Dakota by L. L. Stephens, Frank L. Carter and A. Gary Carter. Buildings formerly occupied by the Washington Motor Car Co., at Hyattsville, Md., a suburb of Washington, have been taken over for a factory.

The advance notices issued by the incorporators state that a small car will be marketed at an attractive price. The company says the car will be equipped with easy-riding comfort springs, the patent for which is controlled by the incorporators.

DENIES KISSEL APPEAL

WASHINGTON, Oct. 10—The Supreme Court of the United States to-day denied the Kissel Motor Car Co.'s appeal for a hearing in a case which involves the construction of the Texas restraint of trade law. The Kissel company, whose plant is located at Hartford, Wis., gave an exclusive territorial agency contract to an agent who became indebted to the corporation. The lower court held that the company could not recover because its contract violated the Texas law.

Willys Progresses in Reorganization

Completion of Negotiations Calling for \$25,000,000 Loan Expected in Few Months

NEW YORK, Oct. 11—Satisfactory progress is being made in the plans for the reorganization of the Willys-Overland Co. They now have reached a point where it is expected negotiations will be completed in a few months. A letter soon will be sent to stockholders of the company asking for their proxies.

The plan has been worked out by a committee of bank creditors headed by Ralph Van Vechten, vice-president of the Continental & Commercial Bank of Chicago. It calls for a loan of \$25,000,000 in the form of a bond or note issue which will run 10 years or longer. It has been understood that Kuhn, Loeb & Co. would underwrite this issue.

Bank loans of \$10,000,000 will mature Nov. 1, and it is understood the company will ask for an extension of four months. The bank debt will be reduced 10 per cent by the payment of \$1,800,000 in cash on Nov. 1. Another reduction of 10 per cent was made by the payment of \$2,000,000 in cash on Aug. 1. The bank creditors are ready to agree to the extension and it is expected that the reorganization plans will have been matured and that the \$25,000,000 will be available before the expiration of the four months.

Willys-Overland has no bonded indebtedness and it can place no mortgages on any of its properties without the consent of two-thirds of its preferred stockholders.

Electric Auto Lite Secures Durant Work

TOLEDO, Oct. 10—A contract for a supply of ignition, starting and lighting equipment for its new four and six cylinder motor cars was closed by Durant Motors, Inc., with the Electric Auto Lite Corp. here, it was announced to-day. T. W. Warner, vice-president of Durant Motors, Inc., and president and general manager of Durant Motors of Indiana, Muncie, negotiated the contract with C. O. Miniger, president of the Auto Lite Corp., on Saturday.

The contract will mean a rapid return to normal production at the Auto Lite plant here.

"Already business has taken a remarkable turn for the better with us," declared President Miniger. "We have increased our force by 200 employees in the last few days. Our program for October is 10 per cent larger than September and in November will increase."

Seager Patents Are Upheld by Court

Essentials Retained in Webb Jay System

Infringement Charges Against Stewart-Warner Sustained in Far-Reaching Decision

CHICAGO, Oct. 10—In an opinion handed down in the Federal Court here, Judge George A. Carpenter holds that the Seager patents on vacuum-tank equipment are valid and have been infringed by the Stewart-Warner Speedometer Corp., which was made defendant in the action. The plaintiffs were James B. Seager, Arthur L. Payton and Cornelia F. Thomas.

Litigation Long Pending

The opinion is the outcome of patent litigation which has been pending for some years and which came to trial last June.

While Seager's patent relates to the application of the vacuum feed to stationary engines operating without a throttle valve, another patent issued to Harrington, also in suit, extends the system to throttle controlled engines, and the court regards the claims as sufficiently broad to cover the application of the vacuum principle to all types of engine.

In referring to the defendant's system, the court decides that while the Webb Jay invention is doubtless an improvement on anything either Seager or Harrington described, the essentials of the Seager combination are retained in it. In this connection the opinion says:

Applicable to Automobiles

"Webb Jay, the inventor of defendant's so-called infringing system, realized that in climbing a steep hill with an automobile the suction of the engine will be inadequate to develop in the reservoir sufficient suction to elevate fuel from the low level storage tank. Jay realized the desired results by enlarging and deepening the lower compartment of his reservoir.

"This made it possible for the level in that compartment to vary as much as six or seven inches. In order to make this reserve capacity available for supplying the carbureter, it was necessary to locate the entire reservoir at a level above that of the carbureter nozzle.

"It was undoubtedly an improvement on anything Seager or Harrington had done, for the defendant to enlarge the reserve capacity of the lower compartment of the reservoir, but this enlargement, and the inclusion of a float chamber and valve in the discharge conduit leading to the carbureter nozzle, does not organically change or avoid the construction, mode of operation and result of the Seager and Harrington inventions.

"The essentials of the Seager combination

are retained in defendant's equipment, notwithstanding that there have been added, first, the Harrington improvement of a two compartment reservoir with intervening valve, and, second, the automatic suction intermitting mechanism."

The court states that while the Seager invention has never been sold to the automobile trade, which was one of the contentions of the defendant, its adaptability for use on motor cars as well as on stationary engines has been demonstrated. Continuing its opinion, the court says:

"In the defendant's system it is the presence of the Harrington invention which permits the use of an obstruction (a throttle) in the airline to the engine at a point between the carbureter nozzle and the point at which the suction conduit is tapped in, so that the suction of the engine, however high it may go, may still be utilized to develop a correspondingly high suction in the upper compartment of the reservoir for elevating fuel into it, while the lower compartment, which is always under atmospheric pressure, will continue to feed fuel to the carbureter, no matter how relatively low the suction upon the nozzle may become; and this, notwithstanding that in the defendant's system there is added to Harrington the automatic suction intermitting mechanism, and notwithstanding that the substantial constancy of the level of the supply to the carbureter nozzle is effected by the float chamber and valve rather than by the overflow pipe of Harrington.

(Continued on page 750)

Brush Charges Ansted Motor Is Infringement

DETROIT, Oct. 10—Alanson P. Brush of this city has brought through Williams, Bradbury, McCaleb & Pierce, attorneys who have recently been engaged in the Seager and Harrington patent suit against the Stewart-Warner company of Chicago, a patent infringement suit against the Chicago sales organization of the Lexington Motor Car Co.

Brush alleges that the Ansted engine used in Lexington cars infringes a number of his patents. He asks that the defendant be made to account for past use and sale, and be restrained from further use and sale of cars equipped with these engines. The Ansted engine has been used in the newer model Lexington cars and has recently been adopted by Durant for his six-cylinder car.

INSTITUTE CHANGES PLANS

NEW YORK, Oct. 11—After careful consideration the board of directors of the American Petroleum Institute has decided to hold the second annual meeting at the Congress Hotel in Chicago, Dec. 6, 7 and 8. Tentative plans to hold the meeting in Kansas City have been cancelled. The program will be announced in the near future.

Tire Manufacturers Increasing Output

All Akron Companies Report Improvement in Sales for Past Month

AKRON, Oct. 11—There has been no appreciable slowing up of the rubber tire industry this fall, despite the fact that the tire manufacturing business customarily enters a period of less activity either in September or October, and does not emerge from it until January or February of the succeeding year.

Instead of curtailing production, Akron rubber companies are increasing their output and expect to make further increases between now and the first of the year. History shows that a 15 to 20 per cent decline in September sales as compared to August sales can be expected in the tire industry each fall; but this year conditions are reversed. Practically all companies here reported increased sales for September and are planning further increases during October.

Goodrich Inventory Reduced

The B. F. Goodrich company, prepared for an anticipated normal sales decline in September over August, reports September sales far in excess of those of August. The company also has gone on a basis of 200,000 tires for October and plans to increase production steadily for the next three months. Goodrich has reduced its finished goods inventory by nearly a million tire units since the first of the year and is now down to an inventory of 300,000 tires. This is actually a smaller number of tires than the company heretofore has had to keep en-transit. The low inventory, Goodrich officials say, reflects the improvement of the past few months in transportation conditions. Goodrich now is at the point where an expansion of inventory is possible.

Firestone Leads

Firestone continues to lead in tire production, with a daily ticket calling for 22,000 tires. Firestone was the only major rubber company to climb back to its 1920 peak production, having returned to a production of 28,000 tires daily three months ago. Goodyear continues on a basis of 16,000 tires daily.

Firestone, Goodyear, Miller and the General Rubber Co. report that both in units and sales volume their 1921 business will exceed that of 1920. This is considered extraordinary in view of the peak business done by all rubber companies during the first six months of last year and the long duration of the tire industry slump.

Urging Surrender of Army Equipment

Highway Officials Appeal to Harding for Transfer to State Road Commissioners

WASHINGTON, Oct. 10—President Harding has received an appeal from the executive committee of the National Association of State Highway Officials to compel the War Department to surrender to the highway commissioners of the various States all available surplus motor equipment and other road building machinery. They are also trying to force quick action on the part of Congress in disposing of the highway legislation. The recommendations of the unemployment conference for the extension of road-building have been seized upon by this committee in an effort to impress both the legislative and executive branches of the Government as to the needs of material and Federal funds.

Wreckers Wish Material

Negotiations are under way looking forward to an adjustment of differences between the War Department and the Bureau of Public Roads, regarding the disposition of motor vehicles and supplies now in the possession of the former. It is understood that the department is daily beset with demands from junk dealers and so-called wrecking corporations to be permitted to take over the motor vehicle surplus stocks, practically at prices dictated by the dealers themselves. These men have received no encouragement under the present administration of the department. One of these concerns is said to have very powerful political backing, and has been insistent in its demands, but whether the influences in its behalf are operating to prevent action on pending bills authorizing the transfer of road building machinery to the State highway commissions has not been disclosed.

One section of the pending bill not only authorizes but directs the Secretary of War to transfer to the Secretary of Agriculture, upon his request, "all war material, equipment and supplies now or hereafter declared surplus from stock now on hand and not needed for the purposes of the War Department, but suitable for use in the improvement of highways," the Secretary of Agriculture to distribute such equipment among the highway departments of the several States.

Will Relieve Unemployment

In the pending good roads bill, which is in conference, an appropriation of \$25,000,000 is provided, to be available immediately, and an additional \$50,000,000, six months after the passage of the act. As reported to the Senate, it carried \$100,000,000 for the present fiscal year and a like amount for the fiscal year 1923, but demands for economy and reduced public expenditures forced a

compromise at \$75,000,000, which if agreed to in conference, will make a grand total of \$369,000,000 provided within the last five years as Federal aid in the construction of good roads throughout the country.

The highway commissioners insist that the States could not buy sufficient machinery for manufacturers at this time to undertake an extensive road-building program. However, they contend that with the transfer from the War Department it would be possible to build hundreds of miles of road, thereby giving employment to thousands.

The House will soon take up the bill and it is said that commissioners are canvassing the various State delegations in order to bring pressure to bear at the right moment.

Seek Approval of Plan for Closing Cotta Plant

ROCKFORD, ILL., Oct. 8—Although receivers of the Cotta Transmission Co. have operated the plant in the last few months to show a net profit of \$5,139.14, the referee in bankruptcy will be asked to approve the recommendation of the creditors that the plant be closed and bids asked for the remaining assets. The factory, under the court order, will operate until sanction is given the closing plan.

Receivers' statements show orders on hand Sept. 17 amounting to \$2,308.50, with liabilities of \$250 and cash balance of \$45,162.20.

Alternative proposals made at a recent conference of the receivers and the creditors were operation of the plant pending disposal upon bids for its remaining assets or continued operation without a definite future program. Court approval would have been required, however, as the receivers' orders were to continue operation of the plant until the court ordered otherwise.

Allen Receivers Ask Permission to Sell

COLUMBUS, Oct. 8—Creditors having consented and urged its liquidation, George A. Archer and William C. Willard, receivers for the Allen Motor Co. of Columbus, have applied to the U. S. court for permission to sell the assets at public auction. The assets consist of the plant, machinery and stocks. Claims against the company are in the neighborhood of \$2,000,000 and assets are estimated at something less than that amount.

AMERICAN ROLLS-ROYCE OPENS

SPRINGFIELD, Mass., Oct. 8.—After a close down of a few weeks the American works of Rolls-Royce are operating on a limited basis. S. deB. Keim, general sales manager, has just returned from an extensive trip through the West in relation to sales distribution and as a result a number of representatives have been appointed. From present indications, the works should be back in normal production at an early date.

Space Is Assigned for National Shows

Ninety-four Cars Will Be Exhibited in New York—Eighty-two in Chicago

NEW YORK, Oct. 6—More than 100 factory executives attended the annual members' meeting of the National Automobile Chamber of Commerce here today to draw space for the New York and Chicago shows. Greater interest even than was displayed last year was shown in the coming expositions.

All the applicants for space will be taken care of at the New York show, which will be held in the Grand Central Palace from Jan. 7 to 13, but the situation in relation to the Chicago show, which will be held at the Coliseum two weeks later, is not so satisfactory.

The overflow from the Coliseum will be taken care of so far as possible in the Armory at Chicago, but even these two buildings will not be adequate to meet the demand for space, and several companies will be unable to make displays.

Ninety-four cars will be shown in New York as compared with 87 last year, and 82 will be shown in Chicago. Only two foreign cars will be shown at New York. They are the Itala and the Vauxhall. The American cars which will be shown in New York but to which space has not yet been assigned are Hatfield, Bournonville, Essex, Rickenbacker and Kelsey. The Rickenbacker probably will be displayed at Chicago also.

The result of the drawing follows:

Note: In Chicago letter X after space means Coliseum or Annex; letter Y means Armory. In New York Show the A spaces are on first floor, B spaces on second, C on third and D on fourth. "Not" means "not showing" or "space not available."

*Means "non-member of N. A. C. C."

New York Space	Car Name	Chicago Space
A-19	Buick	C-5-X
A-11	Dodge	D-1-X
A-15	Studebaker	B-2-X
A-20	Cadillac	A-6-X
A-12	Willys-Overland	C-3-X
A-16	Chevrolet	A-4-X
A-30	Nash	C-1-X
A-14	Hudson	D-3-X
A-13	Olds	C-6-X
A-26	Franklin	B-6-X
A-17	Oakland	A-2-X
A-4	Palge	D-5-X
A-27	Chandler	B-4-X
A-31	Hupp	B-5-X
A-5	Packard	D-2-X
A-3	Reo	C-2-X
A-10	Dort	A-1-X
A-32	Cleveland	D-6-X
A-21	Marmon	F-4-X
A-22	Peerless	D-4-X
A-23	Pierce-Arrow	C-4-X
A-7	Haynes	F-3-X
A-25	Velle	K-1-X
A-8	Lincoln	A-3-X
A-18	Lexington	B-2-X
A-9	Maxwell	F-2-X
A-6	Jordan	F-5-X

(Continued on page 743)

Employment Eases Used Car Situation

Better Industrial Conditions in Indianapolis Promise Greater Business in New Sales

INDIANAPOLIS, Oct. 8—The fact that unemployment here is on the decrease especially with the higher priced mechanics and salaried men is easing off the used car situation, according to dealers. Both lower and higher priced used cars are being sold now with greater ease than for some time. The situation is not what the dealers want yet by any means, but the present situation is indicative of what may be expected in case the industrial situation continues to improve.

For a time this summer the used car problem, especially in the high priced used cars, presented a real problem to dealers. Unless they were able to take in old cars it was virtually impossible to sell new cars to the prospects. The volume of new cars sold, while good, would have been much better had the dealers been able to move used cars. For a time much agitation was being stirred up to get a uniform system in taking in and disposing of used cars, especially with reference to the prices at which they were to be taken in. Most of the dealers in the city at one time had all the used cars they could handle and, because of the slowness of sales, they were unable to take in any more and thus make new sales. A relief in the sales of used cars will doubtless stimulate the sale of new cars, or at least the dealers here believe this will be the case, and it is on this supposition they are basing their assertions that October will be a good month.

The credit situation continues to improve. Local companies who finance buying of both old and new cars report that a noticeable improvement may be seen during the past thirty days and the dealers are finding money easier at the banks than for some time. There are many indications that interest rates will drop before the first of the year.

22,000 Studebakers Sold in Third Quarter

NEW YORK, Oct. 8—Studebaker sales for the third quarter of the year approximated 22,000 cars, or nearly the number sold in the previous quarter. The output for the first nine months aggregated 55,000, which should bring the year's total to 70,000, a number in excess of the best previous year, 1916, when 65,885 cars were turned out. For weeks the company has been oversold on enclosed cars in spite of the fact that the Detroit factories are concentrating on these models.

Because of price reductions, profits of the second quarter, when nearly the full year's dividend of \$7 was returned for

the \$60,000,000 common, will probably not be maintained for the third quarter, the improvement, however, as compared with the third quarter of 1920 being at least 50 per cent.

October 1 Studebaker had more than \$9,000,000 cash in the banks, which is more than double its Jan. 1 balances, and since the first of the year has paid off, in addition, bank loans of \$8,500,000, preferred and common dividends for three quarters and has invested \$1,000,000 in securities.

Durant Will Employ 4000 in Indiana Plant

INDIANAPOLIS, Oct. 8—Thomas W. Warner, vice-president of Durant Motors of Indiana, which recently bought the Sheridan automobile factory of the General Motors Corp. at Muncie, has announced that eventually the Durant factory will employ 4000 persons in the manufacture of automobiles. The Durant company expects to have 800 men at work by Jan. 1. A large force of workmen is now employed in cleaning up the plant and setting machinery.

Plant No. 1 of the Muncie Products Co., a division of General Motors, has 75 more men employed than it had when it was running full time a year ago. Other plants of the Muncie Products Co. also are adding to their working forces weekly.

Cork, Ireland, Votes Ford Freedom of City

CORK, IRELAND, Sept. 28 (*By Mail*)—Henry Ford has had the freedom of the city of Cork conferred upon him "as a token of the city's appreciation of his great interest in the industrial development of his native country," and the next time he visits Ireland he will be honored by a fitting reception headed by the Lord Mayor and the city officials. At the meeting of the city corporation when the honor was bestowed a letter was read from Henry Ford & Son pointing out that a lease of the park taken in 1918 bound them to lay out \$1,000,000 in buildings, and for a period of five years after the completion of the buildings to employ and keep employed at least 2000 men.

In spite of the most formidable difficulties they have erected buildings which covered over six acres of land at a cost of \$1,250,000, and have equipped them with the most modern machinery at an approximate cost of \$2,000,000. At the commencement of the work only about 10 per cent of the tractors was manufactured in Ireland; now 90 per cent is being made in this country, principally in Cork.

In addition they are manufacturing in the Cork factory complete engine and all cast-iron parts of the Ford car for the Manchester factory. There are 940 men employed and paid double the wages stipulated for in the lease. The expenditure on wages alone since the firm came to Cork has been \$2,125,000.

Would Lessen Idle Through Road Work

Association Offers Suggestions to Aid in Solving English Unemployment Problem

LONDON, Sept. 20 (*By Mail*)—In connection with the proposals for relieving unemployment by providing work for unemployed ex-service men in road construction, repairs and improvements, the Automobile Association has recommended to the Cabinet Committee on Unemployment that only such plans for highway work be adopted as will insure 90 per cent of the funds to be devoted to relief going in wages to the unskilled. In asserting that road making is primarily the work of an expert and the proportion of expenditure which can go into the pocket of the unskilled necessarily must be small, it urges that the money be spent on such work as can be done by manual rather than mechanical labor and that the employment must be found where the unemployed are at present situated; in other words, all over the country. It makes the following suggestions:

Appeals to be issued to land owners to give land adjacent to highways for the widening of bends and corners, the extension of visibility and the provision of footways.

The highway authorities acting with the Roads Department of the Ministry of Transport to schedule all offers, to set out the work and to decide the value of such work.

Assuming that one particular job is assessed at 100 days' work, that amount only would be paid and be divided among the number of men actually engaged. The rate per day would be variable according to the amount of work done.

The erection of wire fences and the planting of quick-set hedges or the re-erection of existing fences would be a matter of labor rather than material.

Such relief work would cover, in addition to the setting back of fences, felling and removal of trees, clearing of brushwood and removal of obscuring banks, better surface drainage, and eventually improved gradients and cross falls to the roads themselves when reconstructed or resurfaced.

Such work can be done remuneratively, it is held, in rural areas particularly. Waste can be avoided, the association says, when useful and necessary work only is undertaken on the basis that pay is by results rather than the actual time taken.

Relief of the unemployment situation along similar general lines has been suggested by automotive interests in the United States to the employment conference meeting in Washington.

COURT HEARS HARDWOOD CASE

WASHINGTON, Oct. 10—Argument in the Memphis hardwood case involving the principle of the open price competition plan, which is of interest to the automotive trade, was heard by the Supreme Court this week.

Safety Council Hears Automotive Speakers

Sessions Also Given Over to Discussions by Rubber Section of Organization

BOSTON, Oct. 10—The meetings of the automotive and rubber sections of the National Safety Council which were held in this city drew a larger attendance than many of the other sessions of the council. The tenth annual congress was held at the State House where all the big committee rooms were turned over to the organization. Three days were devoted to the sessions.

Chairman Robert A. Shaw, Ford Motor Co., Detroit, called the automotive meeting to order. Two papers were presented, J. A. Dickinson, Bureau of Standards, Washington, speaking on "Fundamental Principles of Safeguarding," in which he gave deductions from Government investigations, and E. W. Dodge, Abrasive Co., Philadelphia, talking on "Why Grinding Wheels Break."

Kaems, Automotive Chairman

The next day there were four speakers, all of whom explained phases of conserving life and limb in big plants. The speakers and their topics were: W. J. Pferrley, Detroit, Square D Co., "Electric Hazards and Proper Installation"; T. Alfred Fleming, New York fire insurance expert, "Fire Prevention"; David J. Price, Bureau of Chemistry, Washington, "Dust Explosions"; and A. L. Kaems, Simmons Co., Kenosha, Wis., "Punch Presses—Designs of Dies."

The closing session had the following program: "Industrial Surgery and First Aid" by Dr. T. A. McCann, Dayton Engineering Laboratories; "Safety Through Motion Pictures," David S. Beyer; and "Standardization of Statistics," George H. Hawes, Detroit.

The election of officers resulted as follows: Chairman, A. L. Kaems; vice-chairman, E. E. Blank, Buick Motor Co., Flint; secretary, M. K. Averill, Dodge Brothers, Detroit.

Rubber Section Meets

Chairman E. H. Fitzgerald, Federal Rubber Co., Cudahy, Wis., called the rubber section to order. More than 30 rubber companies were represented. In the absence of Secretary Ray N. Watson, Goodyear, S. M. Schott, Morgan & Wright, Detroit, read the paper, "Standard Statistics on the Rubber Industry," prepared by Watson. It was followed by a talk by F. H. Hoxie on "Fire Hazards and Static Electricity in Rubber Plants." The second session had three speakers whose topics were "Safety—From a Chemist's Standpoint," by Dr. Lothar E. Webber, Boston India Rubber Laboratory; "Keeping a Rubber Factory Clean," by William S. Jameson, Fisk Rubber Co., Chicopee Falls; "Practical Plans for Medical Supervision in Rubber Plants," by Dr. R. S.

Quimby, Hood Rubber Co., Watertown.

The final session had as the principal speaker President C. D. Whittlesey, Hartford Rubber Works, who talked on "Safety—From a Factory Manager's Viewpoint." There was also a talk on "Reclaiming Plants and Their Efforts Toward Safe Operation," by John C. W. Baker, Rubber Regenerating Works, Naugatuck, Conn.

Committee reports were followed by an election of officers resulting as follows: Harold T. Martin, Fisk Rubber Co., chairman; C. F. Horan, Hood Rubber Co., vice-chairman, and E. W. Beck, United States Rubber Co., secretary.

May Continue Cadillac Plant for Collins Car

NEW YORK, Oct. 10—Notwithstanding the fact that R. H. Collins has assumed the presidency of the Peerless Motor Car Co. of Cleveland and will take over the active management of the plant, it is possible the development of the new Collins car will be continued in the main building of the old Cadillac plant at Detroit which was purchased by Collins soon after he left the General Motors Corp. It can be stated upon authority that W. C. Durant personally retains his original interest in the development of the Collins car and would like to see it closely allied with his line. Two very fine six-cylinder cars developed by the Collins engineering staff are now running.

It is probable several changes will be made in the present Peerless organization, although it is understood that some of the present executives of the company will remain under the Collins regime. The present Peerless car will be redesigned, but it is understood few important mechanical changes will be made and that attention in this connection will be centered upon body design.

Close Quality Plant Awaiting Inventory

INDIANAPOLIS, Oct. 10—N. M. McCullough, an Anderson banker who recently was appointed in the Federal Court at Indianapolis receiver for the Quality Tire & Rubber Co. of Anderson, has taken charge of the company's property and has closed the plant pending an inventory. McCullough qualified by filing a bond of \$10,000, which, it is understood, covers the personal property, and another bond will be required when the real estate is ordered sold.

ALL A. E. A. SHOW SPACE TAKEN

CHICAGO, Oct. 10—When the exhibit of the Automotive Equipment Association opens at the Coliseum here Nov. 14, in connection with the annual convention of the association, all available space will have been subscribed and a splendid exhibition assured. This year attendance at the show for the afternoons of at least two days will be compulsory on the part of delegates to the convention. The show will continue to Nov. 19.

Bull Bondholders Entitled to Proceeds

Supersede Claims of General Creditors to Share in Sale of Assets

INDIANAPOLIS, Oct. 8—Final disposition of the assets of the Bull Tractor-Madison Motors Corp. of Anderson, bankrupt, has been made by Harry C. Sheridan, referee in bankruptcy, in a ruling that Charles H. Jocknus of New York and John F. Green of St. Louis are entitled as bondholders to the proceeds from the sale of the property of the corporation. Hearing on the claims of the bondholders and of general creditors has been completed before the referee. The amount of the fund that has been held in the Union Trust Co. by Fred C. Dickson, trustee in bankruptcy, is \$120,000, practically all of which was claimed by Jocknus and Green.

The referee heard the claim of J. W. Sandsbury and the National Exchange Bank of Anderson that they were entitled to part of the fund through implied contracts, even though Jocknus and Green were conceded to be bona fide bondholders. Their claim was for about \$20,000. The Citizens Savings & Trust Co. and Wilbur M. Baldwin, trustees, of Cleveland, claimed \$6,400. The referee decided that the claims of the bondholders superseded the claims of those creditors whose claims, he ruled, were general creditors' claims.

Bankruptcy proceedings were filed against the Bull Tractor-Madison Motors Corp., with property in Anderson and Minneapolis, in July, 1920. The trustee in bankruptcy sold the assets of the corporation in November to Goldstein Brothers of Philadelphia. The plants of the corporation have not been operated during the time of the litigation. Settlement of the title to the funds held by the trustee in bankruptcy closes the case, except the formal orders to be made by the referee.

Pennsylvania Meets to Form Association

HARRISBURG, PA., Oct. 10—At a conference here of forty delegates from all leading cities of the State, preliminary steps were taken toward organizing the Pennsylvania Automotive Association, the completion of which will be effected at a convention in the Representatives' Chamber at the State House on Nov. 9 and 10. Gov. William O. Sproul will be invited to attend and invitations will be extended to all branches of the industry in the State.

George G. MacFarland of Harrisburg was appointed temporary chairman at the conference and L. W. Schriener, a jobber of automotive merchandise, temporary secretary. The directorate will be unique inasmuch as each local association will have a representative on it.

Branches Replacing Willys Distributors

New Sales Policy Effective Nov. 1—Expect 7,000 Dealers in Few Months

TOLEDO, Oct. 10—Announcement of the details of the plan by which Willys-Overland Co. will completely reorganize its organization for distribution so as to give more profit to dealers and establish direct contact with factory was made here Saturday.

The plan will become effective Nov. 1.

Not more than twenty-five of the old distributors who have made remarkable records for efficiency in the selling of motor cars will be kept under contract by Willys-Overland, Inc., the great distributing corporation subsidiary to the factory company.

In the future all Willys-Overland dealers will deal directly with the factory through branches of Willys-Overland, Inc.

Better Service Planned

President John N. Willys has devised this new means of meeting the public's demand for cars at pre-war prices in the face of the increased cost of doing business on the part of the dealer. Through the elimination of the middleman's profit both buyer and dealer will benefit, he states.

The close connection with the factory, he says, assures the buyer the most economical and efficient service for his motor car.

"Excepting the securing of the Knight motor franchise, and the development of the Willys-Knight motor, which permits the sale of Willys-Knight cars at moderate prices, I consider this new sales plan the greatest achievement in the history of the Willys-Overland Co.," declared Willys.

"Fortunately, Willys-Overland, Inc., is well-equipped to put into effect the new sales plan at once.

"In 1916-17 a series of branch houses were built in the larger cities of the country at a cost of millions of dollars. In addition long term leases were secured on a number of excellent properties. Thus we are fortified with well organized branch houses to give rapid service, which is so essential today.

"We have anticipated the demand on the part of the public that the middleman be eliminated. It is a part of the movement back to normalcy.

For Better Sales Balance

"Moreover, the time has come when a truer balance of sales between various sections of the country should be maintained. We believe that sales reflect service and that by making possible to dealers in every city, town and hamlet the same factory-supervised service we can expect our products to be distributed in better proportion than in the past.

"All dealers in the United States sold slightly more than 1,800,000 automobiles last year, an average of little more than thirty cars to the dealer. In some states the sales per dealer were as low as eleven cars, in others the average sales were as high as sixty cars.

"Analysis shows that in many cases there

is a wide difference in sales per dealer in territories despite parallel conditions in crops, general financial power and living standards.

"Some states forged ahead and others fell behind. Sales of automobiles in Indiana last year increased 47 per cent compared with 22 per cent the preceding year, while Ohio sales increased only 22 per cent with 24 per cent the preceding year.

"Our investigations prove conclusively that sales are now measured largely by service rendered. We believe the new plan fills the need for our company."

The reorganized plans, calling for improvement of service and parts department sales for dealers, is looked to increase the Willys-Overland family of dealers to 7,000 in a few months.

The Willys-Overland, Inc., branch at Toledo will have under its direct jurisdiction more than 400 dealers where it formerly was limited to a field of a few counties. This will mean that the branch here will have to maintain highest efficiency to serve the dealers. The condition here is typical of the many other large branches of the distributing company.

President Willys says he looks forward
(Continued on page 745)

Fergusson, Engineer, Leaves Pierce-Arrow

BUFFALO, Oct. 8—David Fergusson, for many years chief engineer of the Pierce-Arrow Motor Car Co., has severed his connections with that organization and is reported to be planning an extended vacation. It is probable that the company will not appoint a successor. Delmar G. Roos, formerly assistant chief engineer of the Locomobile Co. of America, has been named passenger car engineer. E. R. Fried, formerly with the General Motors Co. and more recently chief engineer of the Murray Motor Car Co., becomes car chassis engineer.

Ladd Metric System Bill Before Senate Committee

WASHINGTON, Oct. 11—Hearings on the Ladd Metric System bill are scheduled to begin to-day before a subcommittee of the Senate Committee on Manufactures, consisting of Senators McNary of Oregon, chairman; Weller of Maryland and Jones of New Mexico.

The first witnesses to appear will give testimony in support of the measure. Among them are Dr. Harvey W. Wiley, former chief of the Bureau of Chemistry; Dr. Charles L. Parsons, secretary of the American Chemical Society; Howard Richards, Jr., secretary of the American Metric Association; S. L. Hilton, president of the American Pharmaceutical Association; William J. Scheffelin, a drug manufacturer of New York, and Theodore H. Miller of the De Laval Separator Co.

The names of those to appear in opposition to the measure have not been announced. The bill provides for the compulsory adoption of the metric system throughout the country after ten years.

Inventive Genius Is in Wide Demand

Manufacturers Alert for Innovations Which Will Give Superiority to Their Product

DETROIT, Oct. 10—Inventors and students in the automotive field have never had a better opportunity to reach the ear of the manufacturer than at present. Scarcely without exception, each manufacturer has all faculties keenly observant for any improvement or innovation which promises to give his car a superiority over its fellows as to serviceability, driving qualities or general design.

Although there is a great deal of secretiveness attached to moves of this kind, many factories have their engineers testing out ideas, a number of which, it is certain, will be adopted. Nothing epochal is expected, but a very well defined line of improvements may be looked for in the cars exhibited at show time.

Simplification of the driving apparatus is one of the ideas under careful consideration, the factories knowing that any improvement making the car safer and easier to drive will increase its popularity immensely and add largely to the field of prospective buyers. It is realized that apparent complication of driving mechanism has kept many prospects from becoming actual owners.

The elimination of the human element in every possible way is being sought so far as it is possible to have mechanism replace it. Top, curtain, wheel and other incidental troubles of other years, though narrowed down to a fine minimum in cars of recent manufacture, will probably witness a still further drawing of the possible trouble line in the new cars.

Many of the medium and lower priced cars will be seen carrying improvements which up to the present have been confined largely to the higher priced automobile. No sales point that can be put into the car will be neglected.

New Company Formed to Make Wilcox Truck

MINNEAPOLIS, Oct. 8—The Wilcox Trux, Inc., is the outcome of the reorganization of the H. E. Wilcox Motor Car Co., which on April 2 went into the hands of a receiver, F. E. Satterlee. The receiver has brought order out of chaos quickly, the creditors receiving 30 cents. The receivership shortly will be discharged. The liabilities approximated \$500,000 and the book assets \$600,000.

The new company will engage in general machine shop work as well as the construction of Wilcox trucks. The authorized capital is \$300,000. Officers are: President, H. E. Wilcox; vice-president, C. B. Will; secretary, M. H. Boutelle; treasurer, G. W. Lewis. R. D. Wilcox is an additional director.

Automotive Bankers Form Association

Country Wide Organization Will Serve as Clearing House for Information

CLEVELAND, Oct. 10—Representatives of approximately 100 financing companies attended the convention at which the National Association of Automotive Bankers was organized here last week. They represented an annual volume of business of more than \$500,000,000 in the United States and Canada. Members estimated that 65 per cent of the motor vehicles sold in the United States are purchased on the deferred payment plan.

Analysis of the business of the companies showed that the average purchaser is buying a car valued at approximately \$1,300; that he pays more than 50 per cent in cash; that his annual income is in excess of \$4,000; and that his net worth is in excess of \$6,000. More than 70 per cent of the purchasers have bank accounts and carry life insurance. The average purchaser is 33 years old and 75 per cent are married.

Headquarters in Cleveland

The headquarters of the association will be located in the Gotham National Bank building in this city and it will be incorporated in this State as a membership corporation. The organization will be carried into each state and the state branches ultimately will pay for the support of the association on the same basis as those affiliated with the National Credit Men's Association.

The main purpose of the organization is to prevent frauds by unscrupulous automobile dealers who frequently attempt to get two or three companies to finance the same motor vehicles. The association will serve as a clearing house for information valuable to the members and it will attempt, so far as possible, to put into effect uniform systems of accounting with standard financial statement blanks for dealers.

The directors elected were: Fred E. Barrett of Indiana, president of the Indianapolis association; F. A. Weber, Jr., of New York, former president of the New York association; John B. Perlee of Illinois, former president of the Chicago association; H. N. Ritter of Ohio, G. P. Hopkins of Maryland, G. A. Pivrotto of Pennsylvania, H. Abbenseth of New Jersey, H. B. Jackson, president of the New York association, and Walter E. Heller, president of the Chicago association.

Weber Chosen President

The directors elected Weber president, Barrett first vice-president, Perlee second vice-president, Jackson treasurer, and Ritter secretary.

Various activities, helpful not only to financing companies but to dealers, were explained by representatives of various

local associations. For example, it was stated that all the Ford dealers in Chicago have united in a plan to prevent car thefts. Each dealer places on every car a secret number and secret letters. When a car is stolen the police look for these secret identification marks and they are able through the dealers to trace the factory engine number even though it has been obliterated by the thief. In this way they are able to establish ownership. By means of this system the percentage of stolen cars recovered has been very large.

Philippines Imported 3,835 Cars Last Year

WASHINGTON, Oct. 10—The annual report of the Insular Collector of Customs for the Philippine Islands shows that 3835 automobiles were imported during the year 1920, the cost of which was 9,038,156 Philippine dollars. The number imported in 1919 was 2557, valued at 5,947,075 Philippine dollars. Almost all of the automobiles imported came from the United States, the number being 3829, at an aggregate value of 9,017,298 Philippine dollars. One was imported from the United Kingdom, valued at 3403 Philippine dollars, and five were brought from France, at a total cost of 17,455 Philippine dollars.

Importations of automobile parts reached the value of 1,843,678 Philippine dollars. Most of these parts were bought from the United States, insignificant quantities having been purchased from Japan, the United Kingdom and France. The only countries from which automobile tires were brought were the United States and the United Kingdom.

Three New Models by Commerce Motors

DETROIT, Oct. 8—The Commerce Motor Car Co. has three new models coming through, a bus body for the Model T chassis, a Model 18 chassis with longer loading space and 5000 lb. pay load capacity, and a "Store-At-Your-Home" truck, which is in fact a body carrying a small grocery store stock in bins. The bus body, capable of carrying 13 passengers, with equipment of 34 x 4½-in. cords, sells for \$2,300, including the Model T chassis. The new Model 18 sells for \$2,150 in chassis, and the "Store-At-Your-Home" for \$2,250. A refrigerator may be added for \$90 additional.

Another Price Reduction Is Made on Nash Models

KENOSHA, WIS., Oct. 13—Another reduction in prices on all models of the Nash Four effective at once is made by the Nash Motors Co. The prices follow:

	Old Price	New Price
2 passenger roadster....	\$1,175	\$1,025
5 passenger touring....	1,195	1,045
Coupe	1,735	1,645
Sedan	1,935	1,835

Another reduction in prices on this line was made July 2.

Crop Values Govern Truck Investments

Well Developed Road Systems Im- portant Factor in Commercial Vehicle Registration

NEW YORK, Oct. 10—Investment in motor transport and high value products go hand in hand, according to comparison of Government figures on crops and motor vehicle registration on farms, as made by the National Automobile Chamber of Commerce. Iowa, Texas, Illinois, Missouri, Kansas and Ohio are among the first ten states leading in value of farm products and are also among the first ten leaders in farm motor vehicle registration.

Iowa is the banner state both agriculturally and in motor transport, being the first in value of farm products and farm-owned cars, third in average value of crops per farm and number of farm-owned motor trucks, and second in percentage of farms owning cars.

The registration of motor trucks on farms totaled 131,551 as of Jan. 1, 1920, with registration of commercial vehicles heaviest in Pennsylvania and New York where there are well developed road systems as well as a heavy truck gardening business. The corn belt states are leading purchasers of motor trucks, but their demand is small in proportion to the number of farms.

Many farms use more than one motor vehicle per farm. The Bureau of the Census count shows 2,146,512 passenger cars on 1,979,564 farms and 139,169 trucks on 131,551 farms. Cars are owned by 30.7 per cent of all farms, with 2 per cent owning motor trucks.

The Bureau of Public Roads reported a gain as of Jan. 1, 1920, of 22 per cent in the registration of all motor vehicles during the year 1920. If the farm registration increased in this ratio, the farm registration of motor cars to-day is 2,618,744 and of motor trucks 169,786. Sales reports of car manufacturers, however, indicate that the heaviest sales for 1920 were in rural regions so that the general ratio is probably too light for the farm sections, and the total of motor cars and trucks on farms may be as high as 3,000,000.

Highway Council Head Is Now with Autocar

WASHINGTON, Oct. 10—S. M. Williams, chairman of the Federal Highway Council which is discontinuing its highway activities, has associated himself with the Autocar Co., Ardmore, Pa., as special representative. Williams began his highway work with the organization of the Highway Industries Board during the war. Following the disbanding of the board he formed the Federal Highway Council, which in the last few years has been active in developing store-door delivery, studying sub-soils of highways, and backing useful legislation.

Tire Manufacture Continues Increase

More Stocks on Hand for August —Volume of Shipments Greater

NEW YORK, Oct. 10—Statistics compiled by the Rubber Association of America on tire production, shipments and inventory for the Department of Commerce show a steadily increasing volume of manufacture and also an increase in stocks on hand for August as compared with July. The figures by months since November, 1920, which was taken as the base month, up to September follow:

PNEUMATIC CASINGS			
1920	Inventory	Production	Shipments
Nov.	5,880,016	649,742	806,023
Dec.	5,508,380	506,111	1,327,153
1921			
Jan.	5,319,605	703,430	965,417
Feb.	5,193,018	819,892	1,073,756
Mar.	4,597,103	1,163,314	1,614,651
Apr.	4,527,445	1,651,418	1,785,951
May	4,451,668	2,100,917	2,085,882
June	4,154,456	2,313,265	2,643,850
July	3,892,037	2,570,524	2,757,581
Aug.	3,934,583	3,043,187	2,894,442

INNER TUBES			
1920	Inventory	Production	Shipments
Nov.	6,131,935	742,815	920,938
Dec.	5,786,929	508,446	1,481,285
1921			
Jan.	5,586,163	740,824	1,042,617
Feb.	5,415,464	916,627	1,129,881
Mar.	5,044,861	1,346,483	1,643,690
Apr.	4,916,772	1,762,122	1,983,571
May	4,751,880	2,210,040	2,342,567
June	3,835,098	2,359,928	3,232,673
July	3,122,815	3,020,981	3,603,248
Aug.	3,649,319	4,430,152	3,804,060

SOLID TIRES			
1920	Inventory	Production	Shipments
Nov.	298,875	21,355	34,217
Dec.	303,473	16,297	40,828
1921			
Jan.	303,753	21,220	29,116
Feb.	304,374	23,365	29,599
Mar.	283,800	28,710	43,926
Apr.	269,985	28,859	42,080
May	264,633	35,156	40,122
June	240,336	28,395	49,867
July	220,003	35,123	55,678
Aug.	216,367	55,694	66,866

"Production" and "Shipments" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.

"Inventory" includes tires and tubes constituting domestic stock in factory and in transit to, or at, warehouses, branches (if any), or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as a domestic stock.

"Shipments" includes only stock forwarded to a purchaser and does not include stock forwarded to a warehouse, branch, or on a consignment basis, or abroad.

Employment Increases in Southern States

ATLANTA, Oct. 10—Concrete evidence that general business conditions in Atlanta and throughout the sixth Federal Reserve district, which comprises the Southeastern area, are at the highest mark since the first of this year is furnished in the monthly statement issued by the Federal Reserve Bank of Atlanta for September. All lines of wholesale and retail trade show material improvement.

The boom in cotton prices is given as the main reason for the general bet-

terment of business over the Southeast, and the bank predicts a further rise in cotton prices during October. Increases in employment are shown in the principal industrial centers of the section. Among Atlanta dealers and distributors of motor cars and trucks this betterment is being felt in increased demand, especially in the rural districts. As a whole, however, the improvement will not be felt by the automobile business in the section for at least two or three months. Especially is this true of the higher priced cars.

September bank clearings in Atlanta were almost \$30,000,000 larger than clearings during August.

Space Is Assigned For National Shows

(Continued from page 738)

New York Space	Car Name	Chicago Space
A-24	Auburn	E-1-X
B-27	Stephens	F-1-X
B-26	Stearns	H-1-X
A-2	Chalmers	A-5-X
A-29	Gardner	B-1-X
B-28	Stutz	O-2-X
A-1	Cole	G-1-X
B-24	Locomobile	H-2-X
B-9	Moon	E-4-X
B-29	Liberty	G-2-X
B-25	Briscoe	O-1-X
B-23	Mitchell	P-1-X
B-30	Elgin	J-1-X
B-12	Grant	N-1-X
B-2	Mercer	M-1-X
B-8	Lafayette	E-3-X
B-4	Case	A-1-Y
B-16	National	F-2-X
B-10	H. C. S.	M-2-X
A-28	Apperson	Q-1-X
B-3	Barley (Roamer)	B-2-Y
B-18	Westcott	Q-2-X
B-17	Kissel	Q-3-X
B-31	Templar	A-4-Y
B-1	Columbia	B-1-Y
B-13	Holmes	B-3-Y
B-14	Elkhart	Q-4-X
B-6	Davis	A-3-Y
B-15	Premier	A-2-Y
B-22	Standard Steel	A-8-Y
B-7	Crow	A-7-Y
B-21	R & V	A-6-Y
B-20	McFarlan	B-7-Y
B-11	Saxon	E-2-Y
C-3	King	B-5-Y
B-19	Maibohm	E-1-Y
C-20	Anderson	C-1-Y
C-12	Jackson	A-5-Y
C-4	Dorris	B-8-Y
C-19	Dixie Flyer (Kentucky)	B-4-Y
C-14	Sayers	B-6-Y
B-5	Milburn	E-4-Y
C-6	Detroit Electric	E-6-Y
C-18	Paterson	C-3-Y
C-7	Pilot	E-3-Y
C-5	Stevens-Duryea	E-5-Y
C-2	Wm. Small (Monroe)	C-2-Y
C-15	Hanson	C-5-Y
C-21	DuPont	Not
C-8	Commonwealth	C-4-Y
C-11	Kline	Not
C-13	Rauch & Lang	C-6-Y
C-1	Durant	D-1-Y
C-9	Handley-Knight	L-1-X
C-16	Wills St. Claire	D-2-Y
C-10	Ambassador	Not
C-22	*Stanley	Not
C-17	*Noma	Not
D-1	*Leach	Not

River Rouge Works on Four-Day Week

Further Reduction in Time at Ford Foundries Scheduled for November

DETROIT, Oct. 10—Indications of a gradually decreased production by Ford Motor Co. and the allied Ford interests for the winter months are seen in the notice issued to workmen in the Ford foundries at River Rouge of a four-day week for the balance of October and a three-day week for November.

All of the Ford foundry work is now done at the River Rouge plant, the foundry at the Highland Park plant having been discontinued the past month and the transferral of equipment having been made to the Rouge. With a slowing down in business, activities are being cut down all along the line. The foundries, being the starting point of all construction, are the first affected.

All Employees Retained

Although no formal announcement of the Ford retrenchments or of its winter manufacturing policy has been made, it is known that under its plans practically all employees will be kept on the rolls through its part time system. No complete cessation of work is expected, business conditions being far more satisfactory than a year ago.

In most of the other plants, aside from the makers of higher priced cars, much the same manufacturing policy will be carried out. Sales in higher priced cars are keeping the factories at close to 100 per cent production, and this activity promises to extend to the first of the year, and probably until spring.

Several of the medium priced cars and one low priced car are also well sold up into the future. Briscoe, soon to give way to the Earl, is said by the factory to be sold through 1922. Rickenbacker, with its promised 12,000 production in 1922, is also practically assured of a sell-out by business already received. Chevrolet is said to have enough business on its books to carry it through to August, 1922. Buick and Studebaker are also declared sold well into the future and Dodge Brothers is going steadily ahead on its 550 a day schedule.

Equalizing Inventories

Those factories which have made curtailments in working schedules have done so to equalize inventories as work progressed and the employee organization is being kept in mobile order so that it can be quickly summoned to meet any sales requirement. No particularly dull period is expected during the winter months and everyone will be kept working, part time at least.

The care of the factories in holding together their employee organizations testifies to the general excellence of the men now working in the industry. There has been no time in recent years when the class of worker was of higher grade.

Export Statistics Are Reclassified

Chassis and Complete Vehicle Divisions Are Supplanted by Price Classes

WASHINGTON, Oct. 12—Export statistics of automotive products issued by the Bureau of Foreign and Domestic Commerce, have been reclassified and beginning with Jan. 1, 1922, will be listed in more detailed divisions than heretofore. The new classifications will be such as to render the statistics of considerably greater value to the industry in analyzing markets and planning sales campaigns in foreign countries.

Cars, trucks, tractors, airplanes and tires are among the chief automotive products to undergo reclassification. Heretofore exports of cars have been listed as to number and value, the divisions being chassis and complete vehicles. This classification has been of relatively small commercial value to the industry. The new divisions, however, will be one of price classes. Thus the monthly export figures of cars, beginning next January, will be listed under the three following classifications by number and value:

1. Under \$800.
2. Over \$800 and under \$2,000.
3. Over \$2,000.

Different Truck Listing

In accordance with this reclassification, there will be no distinction made between chassis and completed vehicles. Such distinction, however, is of practically no importance, according to prominent members of the industry who make extensive use of the figures.

Trucks will be listed according to rated capacity. The following classifications will be used, number and value being given in each case:

1. 1 ton and under.
2. 1½ tons to 2½ tons inclusive.
3. Over 2½ tons.

Under the new system there will be a separate classification of electric vehicles, while trailers will also be listed separately according to number and value.

Tires will be classified and listed in detail under the new procedure, the divisions being as follows:

1. Pneumatic casings for automobiles.
2. Other pneumatic casings.
3. Pneumatic tubes for automobiles.
4. Other pneumatic tubes.
5. Solid tires for automobiles and trucks.
6. Other solid tires.
7. Tire repair materials.

Aircraft Amplified

The aircraft export statistics will be amplified by the following groupings:

1. Airplanes and hydroplanes.
2. Other aircraft.

Under the present procedure all aircraft is bulked together under one general head.

The reclassification of these vital export statistics is being carried on under the direction of John Hohn, chief of the statistical division of the Bureau of Foreign and Domestic Commerce. The new and more detailed grouping of automotive products was determined upon at a conference of the statistical division and the new automotive section of the Bureau. The reorganized bureau is undertaking similar reclassification of export statistics in many lines and when completed plans for next year are announced there will be shown between 700 and 1300 new classifications of export statistics, each designed to aid directly and practically the American manufacturer in selling his foreign markets.

BANK CREDITS

Following upon the recent announcement of increased prices for certain steel products, come further data supporting the belief that the iron and steel industry, as regards production at least, has reached the approximate bottom. The United States Steel Corporation's report of unfilled tonnage, as of Sept. 30, shows an increase for the first time since July, 1920. The unfilled orders on the books as of that date were 4,560,670 tons, an increase of 28,744 over the previous month, and is indicative of the increased rate of production as compared with shipments. The Steel Corporation's subsidiaries were working at 38 per cent of capacity at the close of the month, it is estimated, as against 30 per cent on Sept. 1. The country's pig iron production for the month of September showed an increase for the second consecutive month. The output for the month amounted to 985,529 tons, or at the rate of 32,850 tons per day as compared with an average daily output in August of 30,780 tons. There were 12 more furnaces in blast on Oct. 1 than there were a month previous.

Dun's and Bradstreet's latest index numbers again indicate a relative degree of stability in prices. For the fourth consecutive month, Bradstreet's index number increased. The increase during September was .92 per cent as against .41 per cent in the previous month; while Dun's index number showed a decline of only .48 per cent as against .66 in the previous month and an increase of 2.41 per cent two months ago.

There was little change in the Federal Reserve System's technical position last week. The reserve ratio duplicated the high for the year made the previous week, at 69 per cent. Gold reserves of the system increased \$6,633,000, while deposits declined \$21,073,000, and Federal Reserve notes in circulation increased for the first time in some months by \$25,117,000. The decline in inter-bank borrowing was indicative of a more uniform distribution of the improvement which has been characteristic of the system in recent months.

G. M. Graham Resigns from Pierce-Arrow

Becomes Chandler Vice-President in Charge of Sales, Service and Advertising

BUFFALO, Oct. 13—George M. Graham, one of the most prominent figures in the automotive industry, has resigned as vice-president of the Pierce-Arrow Motor Car Co. to become vice-president of the Chandler Motor Car Co. in charge of sales, service and advertising. He will assume his new duties Nov. 1. Graham, who formerly was a newspaper man, has been the spokesman of the industry on many occasions because of his ability as an orator. He also is an analyst and economist of note.

During the war Graham served as chairman of the Motor Truck Committee, making his headquarters in Washington. He appeared frequently before various divisions of the War Department, committees of Congress and the War Industries Board, obtaining recognition and concessions for the automotive industry.

Prominent in N. A. C. C.

Graham has addressed meetings of automobile dealers throughout the country, telling them of the achievements of their industry. Thousands of copies on his address on motor vehicle regulation before the National Highways Convention were distributed throughout the country. He has spoken before the Chamber of Commerce of the United States and numerous other national organizations.

Graham is a member of the highways, motor truck and taxation committees of the National Automobile Chamber of Commerce. He was one of the two spokesmen who discussed problems of the industry with President Harding last spring and he recently has appeared in Washington several times in connection with hearings on pending legislation.

After leaving the newspaper business, Graham was associated with publicity, advertising and promotion campaigns for such companies as White, Packard, Pierce-Arrow and Mitchell. When he decided to devote all of his time to the automotive industry he joined the Willys-Overland company and from there went to Pierce-Arrow five years ago. He explains that a desire to associate himself with a quantity production company producing popular priced and high grade cars prompted him to join the Chandler company.

TO ACCEPT STANWOOD OFFER

NEWARK, Oct. 13—Vice Chancellor Backes has authorized Receiver John P. Kirkpatrick of New Brunswick to accept the offer of \$60,000 for the assets of the Stanwood Rubber Co., made by a committee of the company's creditors, representing 85 per cent of the claims against it, and the company is to be reorganized for business.

Engineers Witness Ordnance at Work

Almost Every Form of Equipment Demonstrated at Army Association Annual Meeting

ABERDEEN PROVING GROUNDS, ABERDEEN, MD., Oct. 10—Several hundred engineers representing the membership of the Society of Automotive Engineers and the American Society of Mechanical Engineers were guests of the Army Ordnance Association at its third annual convention at the proving grounds here and witnessed one of the most comprehensive demonstrations of ordnance apparatus ever staged. A program was carried out that continued from 9 o'clock in the morning until 8 in the evening and embraced a demonstration of almost every form of ordnance equipment from the 16-inch 50-calibre army gun that throws a shell weighing 2340 pounds 50,000 yards to the smallest machine gun.

Proves Field Day

The demonstration of motorized ordnance proved a veritable mechanical circus, embracing every form of vehicle that pulls ordnance or transports ammunition. The tanks, motorized gun mounts and motor trucks had a field day over the rough proving grounds. The following is a list of motorized equipment participating in the event:

- 75 mm. gun and 105 mm. howitzer motor carriage.
- 155 mm. gun and 8-inch howitzer motor carriage.
- 75 mm. gun and 105 mm. howitzer motor carriage.
- Self-propelled caterpillar, Mark VII.
- Self-propelled caterpillar, Marks I, III, IV.
- 2½, 5 and 10-ton caterpillar tractors towing gun carriages.
- 2½-ton divisional tractor.
- 20-ton tractor.
- Peoria reconnaissance tractor.
- Syracuse reconnaissance tractor.
- Millitor truck with Chase track-laying attachment.
- Tanks in all sizes.
- Christie tank.
- White chassis with British belt track-laying attachment.
- Manly hydraulic transmission truck.
- 3-ton Christie trailer
- Cleveland 1½-ton trailer.

Foreign Vehicles Inspected

A 75-mm. gun on caterpillar was driven through 5 ft. of water, the vehicle having a waterproofed engine and transmission. Practically all engineers present were given an opportunity of riding on the different types of vehicles. In fact, it was the wish of the army association that all guests make a trip on the apparatus.

Following the tractor circus was an inspection of German, French and Italian motor vehicles that are housed in a commodious building on the proving grounds. These consist of trucks, tanks, trailers, steam vehicles, everything, in

fact, considered worth while by the ordnance department.

The exhibition of guns and the firing demonstration were most elaborate. Everything in the ordnance category was demonstrated by firing, from the big gun to the smallest Browning machine gun. An opportunity was given the guests to look minutely into all of the gun mechanisms. There were exhibitions of firing small guns with tracer bullets, demonstrations at night with flashless powder in 75 mm. guns, and in short, a most complete demonstration of every type of gun.

Airplane demonstration was largely confined to examination of Martin bombers and Handley-Page machines. During the day the Handley-Page dropped a 2000-pound bomb on the proving grounds in plain view. Smaller bombs were also dropped. An opportunity to examine in detail the navy blimp C2 was afforded.

Branches Replacing Willys Distributors

(Continued from page 741)

to 1922 as the greatest automobile year in history.

"A survey of the situation indicates the possible need of between 2,000,000 and 3,000,000 cars for replacement during the coming year," he declared.

"Up to January, 1921, figures show that 11,839,483 motor vehicles had been built in the United States since 1899. Of this number 613,695 had been exported. Registrations in 1920 amounted to 9,211,295. In other words, since records of automobile production were first tabulated 2,014,483 cars were worn out or discarded.

"In 1919 some 596,969 were discarded. This is very close to the actual number of cars built in 1914, the actual figure being 569,045.

"Now let us compare the discarded cars in 1920 with the production in the fifth year preceding. In 1920 some 517,556 cars were discarded as against 892,000 built in 1915. It is apparent that financial stringency and the holding back of the public on account of falling prices resulted in 374,444 cars being carried over.

"In 1916 the first huge volume production was accomplished. In that year 1,583,617 cars were built. It seems probable that the first six months of this year will see the replacement of about 1,000,000 cars, the other half million cars normally ready for replacement being carried over for the same reasons as those in 1920.

"Now in 1917 were built 1,868,947 cars.

"This figure added to the normal total of cars held over and not replaced in 1920 and 1921 gives a total of 3,000,000 cars which the records of past year show would normally come in for replacement under normal conditions in 1922.

"Even if sub-normal conditions continue we should face the greatest year for replacement in history."

Willys pointed to the manufacturing economies of his company and declared that the increasing efficiency of the last ten months was enabling Willys-Overland to give a better value than ever before.

G. B. McNary, formerly in charge of the branch at Sacramento, has been made head of the Willys-Overland, Inc., office in Dallas.

Appeal to Harding on Sales Tax Plan

Representatives of Automotive Industry Endeavor to Obtain Support for Smoot Bill

WASHINGTON, Oct. 10—Speaking for the National Automobile Chamber of Commerce, C. C. Hanch, executive vice-president of the Lexington Motor Co. and chairman of the taxation committee of the N. A. C. C., has made a personal appeal to President Harding to use his influence in fulfilling the Administration's pledge of tax relief for American business. He directed the attention of the President to the fact that coteries in Congress were menacing economic recovery and characterized the tax plan as now proposed by Senate and House as "mere fly specks in the business situation."

Hanch Sends Letter

The automotive industry in common with many other manufacturers sent its representatives to a White House conference in a final effort to obtain the support of the President to the proposed manufacturer's sales tax plan known as the Smoot bill. The opinion of American business men as represented in the manufacturers' national tax committee was made known by John E. Edgerton, president of the National Association of Manufacturers.

The industry was represented at the conference by Hanch, J. Walter Drake, president of the Hupp Motor Car Corp., and Pyke Johnson, Washington representative of the N. A. C. C. The visit was followed by a letter to the President signed by Hanch as chairman of the tax committee of the N. A. C. C. Mention was made of the fact that many legislators believe that a manufacturers' sales tax is inevitable.

Seek Just Taxes

In his communication to the President, Hanch made clear the thought of the industry on tax revision. He said:

"At this moment your administration is plagued by cliques and blocs in Congress which are the direct outgrowth of existing class legislation. The continuance of repressive war measures during times of peace will inevitably create a riot of class rivalries, class hatreds and class laws.

"Aside from the proposed repeal of transportation taxes all of the other proposed repeals of discriminatory war taxes are but mere fly specks in the business situation. How much simpler and better it would be if the Congress would accept your constructive recommendation to 'abolish inequities' by the repeal of all special discriminatory stigma war taxes and the substitution thereof of an equitable manufacturer's tax. Many congressmen who fear an equitable tax at this time unhesitatingly say that such a tax is inevitable later on.

"In view of the foregoing we respectfully suggest the propriety of your reminding Congress again of the necessity in the public interest for 'the abolition of the inequities and unjustifiable exasperations in the present (taxation) system.'"

October Expected to Maintain Pace

Value of Sales Will Probably Be Higher Because of Enclosed Car Demand

NEW YORK, Oct. 12—While it is probable sales of passenger cars will decline somewhat this month from the total for September, there is every indication that the volume of business will not show a large shrinkage. It would not be surprising if it was found that the next 30 days were approximately as good as the past thirty.

Notwithstanding the unsettling effect of a large number of price reductions, shipments of automobiles in September were only 4 per cent less than in August and it is significant that they were 85 per cent of September, 1920. It is probable the October total will equal or exceed the total for October last year and that comparisons from then on will show a balance favorable to each current month. While predictions are unsafe in a period of deflation and readjustment, there appears to be little danger in asserting that so far as the automotive industry is concerned the worst is over.

Higher Priced Cars Gain

The slight falling off in business last month was in the lower and medium priced cars, and almost without exception the companies making cars in the higher price classes had material gains in business. Orders for high priced cars continue to come in on a basis which indicates that the September gain in sales will continue this month.

Production schedules for October have been curtailed in only a few instances although production will be kept strictly to a sales basis and accumulation of surplus cars in the hands of dealers or in warehouses will not be permitted. The largest decline in car production last month was in the Ford plant where the total was approximately 90,000. The company expects to produce an equal number of cars in October, but if there is a sharp falling off in orders, of which there is no indication at present, this output will be curtailed.

Truck Market Improves

The indications are that while the actual number of cars sold in October will be smaller than in September, the aggregate value will be higher because with the slackening of demand for touring cars there will be an increased sale of enclosed models, which are all in a higher price class. Almost without exception, body builders are running close to capacity on enclosed models, and dealers report an exceptionally strong demand for cars of this class.

One of the most gratifying features of the situation to-day in the automobile field is the increased call for motor trucks. Sales of light delivery trucks have been better for several weeks and

"JITNEY" DISCARDED; IS REPLACED BY "BUS"

NEW YORK, Oct. 10—The motor truck manufacturers of the country propose to take the "jit" out of jitney. In fact, they are opposed to the use of the word at all and will use all the influence they have to bring about the substitution of motor bus or just plain bus. They believe "jitney" has come into bad repute and the public generally misunderstands the term. A good many people who would be glad to ride in a motor bus shun the jitney in the belief that it is likely to be a converted ice wagon.

they now are extending into the heavy duty field. This is an unmistakable indication that general business is improving and that the larger volume of freight makes necessary an extension of transportation facilities.

Gustafson New Manager of R. & V. Motor Co.

EAST MOLINE, ILL., Sept. 21—Discontinuance of the Moline Engine Co., proposed taking over of the poppet valve business by the Moline Plow Co. and recent sale of a portion of its properties to the Troy Laundry Machine Co., have necessitated changes in personnel of the R. & V. Motor Co.

Executive staff and directorate of the company remains unchanged with H. A. Holder president, but G. L. Walker of East Moline, assistant secretary and treasurer, becomes assistant to the president, and Gust Olson is elevated to chief engineer. A. A. Gustafson is made general superintendent or works manager directing assembling of chassis, plant maintenance, tool room and stores, machine shop, test and inspection.

D. M. Beal, who has been assistant sales manager, assumes responsibility for the finished car, a department which embraces chassis test, painting, trimming, assembly and final test. Department executives continue unchanged.

Firestone in Alabama Surpasses War Times

BIRMINGHAM, ALA., Oct. 10—As a barometer of the improved conditions in the automobile industry in the local field the branch office of the Firestone Tire Co. here has done a larger business in the past ninety days than it did during the peak of the war days, and with a smaller sales force. This, according to P. D. Mingleford, manager of the branch, is due to the fact that more cars are moving now than have been moving at any period since last December and also to the fact that farsighted dealers, seeing the rush coming with prosperity's return, began stocking up long before the crest of the hard time wave had passed.

Plan of Lafayette Is 100 Cars Monthly

Schedule Will Continue Through Fall and Winter With Increase in Spring

INDIANAPOLIS, Oct. 10 — The Lafayette Motors Co. of this city is celebrating the completion of the first year of production with a convention of distributors here. According to data given out by Charles W. Nash, president of the company, to the men attending the meeting, 800 Lafayette cars have been shipped to distributors and more than 700 are now in the hands of owners. Since May 1 orders at the factory have run approximately 100 ahead of production and, on the basis of present orders and the feeling among distributors, plans have been laid for the steady production of 100 cars a month during the fall and winter, with a large increase in the spring. The productive capacity of the plant as it is now is ten cars a day. Nash and officials of the company are confident of reaching this mark in 1922.

The Lafayette company now is represented by thirty direct distributors, a large percentage of whom handle the Lafayette in conjunction with the Nash. While the production for the first year falls considerably short of the mark set, Nash considers the record a good one, inasmuch as the industrial depression set in almost simultaneously with the shipment of the first car from the plant in 1920.

With only minor details, the chassis has not undergone change during the first year and no change is expected. One new body style, a roadster, has been added, and Nash states that there may be other body styles to satisfy any justifiable demand.

Case Against Buffalo Broker Is Dismissed

INDIANAPOLIS, Oct. 10—Charges of extortion, preferred against John B. Porter of Buffalo, N. Y., who recently filed charges of grand larceny against Newton VanZandt, former president of the Revere Motor Car Corp. of Logansport, have been dismissed by authorities at Erie, Pa., where the case was filed, according to information received here. Porter was arrested in Logansport several weeks ago on the charge. At that time he was in the city to testify before the Cass County Grand Jury in connection with an investigation into the rumors and allegations concerning the Revere corporation.

SHERMAN VISITS LOUISVILLE

LOUISVILLE, Oct. 8—Ray W. Sherman, merchandising director of the Automotive Equipment Association, was the principal speaker at the meeting of the Louisville Automobile Dealers' Association.

Car Makers Urged to Give More Help

Used Cars, Financing and Contracts, Subjects Considered at
N. A. C. C. Meeting

(Continued from page 736)

Shale contended that the automotive industry cannot be placed upon a really solid foundation until the manufacturer assumes a greater share of the dealer's financial burden. He pointed out the large volume of sales made on the deferred payment plan and held that unless business was continued on this paper there would be a large falling off in sales. This was his advice to the manufacturer:

Shale's Suggestions

"Your margin to the dealer should be sufficient to enable him to give a cash discount, allowing him to receive a like discount from you if he pays in cash, or allowing him to pass this installment paper to you in settlement of his obligation at par, with legal interest added. The manufacturer can at all times have a reserve set up for this cash discount, either to be taken by the dealer when settlement is made in cash or to provide you with a fund that will enable you to use this reserve to sell the installment paper to produce cash.

"I believe it is essential that the manufacturer should be the pivot point through which this paper should be handled, so that the sales by his dealer will be readily taken care of. This would be in lieu of your giving the dealer unsecured credit.

"The manufacturer, in establishing new distribution, should require that his dealer have sufficient capital to carry his stock for all display purposes, necessary parts for service and take care of his selling expenses, to the period when his profit begins to come back to him by reason of these sales on the installment plan, which in the ordinary case would be about six months."

Schumann's Contentions Similar

It was also the contention of Schumann that manufacturers should bear a greater share of the burden. He said that an investigation made by his company disclosed that banks in the Central West and New England preferred truck paper to passenger car paper, but that on the Pacific Coast the reverse was true.

In the discussion of the used car problem some of the suggestions made were:

That all used cars be reconditioned before they are sold and given the same backing by the dealer that he gives to new cars. This would inspire confidence on the part of prospective purchasers and bring many new prospects into the market. It was felt that every purchaser of a used car was a potential purchaser of a new one.

That dealers establish co-operative repair-shops where used cars could be reconditioned instead of each dealer maintaining his own shop.

That each dealer assign his best salesmen to the task of selling used cars instead of leaving it to the "cubs."

That each salesman be compelled to find a purchaser for every car he takes in a trade. That there be a co-operative advertising campaign on the part of the manufacturers to promote the sale of used cars. There was a sharp division of sentiment on this question, however, and it seemed to be the general idea that each manufacturer should work with his own dealers in advertising used cars.

As a result of the discussions, the N. A. C. C. will make an investigation of markets to determine in what way dealers can best be helped and educated.

Contract changes proposed by the committee representing the N. A. D. A., which has had two sessions with a special committee appointed by the N. A. C. C., were explained to the members. They were discussed at some length and the N. A. C. C. committee was authorized to hold another session with the N. A. D. A. representatives. This meeting will be held next week in Detroit.

Some of the contract changes proposed by the dealers probably will be accepted by the manufacturers, but not all of them. No matter what recommendations are made by the N. A. C. C. committee it will be impossible to carry them into effect except through their acceptance by each individual manufacturer.

There is a general feeling on the part of the vehicle builders that some of the unsatisfactory conditions which existed when the two committees were appointed already have righted themselves and that these readjustments will continue automatically. They assert that the attitude taken by factory sales managers is less arbitrary than in the past and that relations with dealers will become increasingly closer in the future.

NOMA PRICES CUT

NEW YORK, Oct. 8.—The second reduction in 60 days has been announced by the Noma Motor Corp., manufacturer of Noma cars. The change made is as follows:

	Old Price	New Price
Roadster	\$2,800	\$2,500
4 passenger touring....	2,850	2,550

The prices are f.o.b. factory, plus war tax. No change has been made in the prices of the other models.

INCREASE FOR NATIONAL

INDIANAPOLIS, Oct. 8.—The National Motor Car and Vehicle Corp., manufacturer of the National has increased the prices on its sedan and coupe as follows:

	Old Price	New Price
7 passenger sedan.....	\$3,990	\$4,240
4 passenger coupe.....	3,990	4,140

There is no change in the prices of other models. All prices are f.o.b. factory.

TRACTORS REDUCED

CHICAGO, Oct. 8.—The Emerson Brentingham Co. has made a reduction of 10 per cent in the price of tractors and 20 per cent in that of farm implements.

Price Reductions Spur Texas Trade

Liquidation of Accounts Contributes to Improvement of
Automobile Business

DALLAS, Oct. 11.—While no figures are available as to the exact number of automobiles sold by Dallas dealers during the month of September the dealers themselves declare the business was as good as that during the preceding months when sales records for the past eighteen months were hung up. Practically every dealer in Dallas reported business brisk with sales getting better. They attribute the improved business in the automotive trade generally to more money in circulation and the customers, actual owners or ultimate consumers of all lines having more confidence in the financial stability of the period.

Lower prices of cars coupled with marketing of the cotton and grain crops and the placing of that money in actual circulation through liquidation of accounts are the actual reasons for better automobile business in this section. The farmers are marketing cotton at prices that have enabled them to pay accounts and have something left. The automobile dealers have not overlooked this and as a result sales have been made. Scores of persons who have bought cars in Dallas during the past month have been waiting for reductions along pre-war lines. When those reductions came the selling began in earnest.

As during the preceding month, the normal priced cars led in sales. High priced cars, however, were going right along and dealers said the outlook was brighter. Indications are now that the total automobile business in Dallas this year will amount to \$225,000,000, which is a considerable increase over the business for the past year.

Truck and tractor men reported better business, especially with the farmers. A great number of trucks, tractors and trailers have been shipped out of Dallas to the farmers of the wheat belts of Texas, Oklahoma and the cotton belts of these two States and Louisiana and the ranchers and cattlemen of Texas and New Mexico during the past month.

NEW SOCIETY FOR ENGINEERS

NEWARK, N. J., Oct. 8.—Realizing the importance of co-operation in the development of friction drive, now becoming a recognized factor in many industries, a number of prominent engineers have formed the Friction Drive Engineering Society. Temporary officers have been elected as follows: President, C. A. S. Howlett of Divine Brothers Co., Utica, N. Y.; vice-president, W. D. Hamerstadt of the Rockwood Mfg. Co., Indianapolis, Ind.; secretary and treasurer, C. W. Kelsey of the Kelsey Motor Co., Newark, N. J.

INDUSTRIAL NOTES

S-P Mfg. Co., Cleveland, has purchased the former American Air Chuck Co. of Chicago. The work of re-establishing the business is well under way and with the aid of J. A. Colson, inventor of the American company's product, who will be associated with the S-P concern, the product will be ready for the market within a short time. The regular business of the S-P company has consisted of the design and manufacture of special machinery, fixtures, jigs, tools, etc., a line that will be continued and, as the demand increases, additional equipment will be installed for the manufacture of the air devices. The company plans to develop further the use of air power equipment for production to replace the hand methods of chucking work and similar operations.

Victor Rubber Co., Springfield, Ohio, earned a profit of \$62,030, during July and August, according to President H. S. Berlin, and in addition set aside \$36,781 as a reserve for unanticipated contingencies. Thus far this year the production of the plant has been doubled by installing improved methods in manufacture; operating costs have been substantially decreased and the sales for the twelve months will be the largest of any period in the company's history, Berlin says. The number of sales agencies will be doubled. The directors of the company have declared the quarterly dividend of 1 1/4% payable Oct. 25, on all preferred stock.

Kendall Tire & Rubber Co. and **Ariston Tire & Rubber Co.**, Massillon, Ohio, have been placed in the hands of W. S. Adams, receiver, on a petition of the First National Bank of Louisville, which claims \$22,000 on notes given by the two companies. **Fidelity Tire & Rubber Co.** of Illinois, which has been operating the plant by lease, is made a party to the action. The bank holds that its claim is secured by mortgage on the machinery and equipment of the companies and that the use of this material under lease to the Illinois concern lessens its value. Judgment on the note and foreclosure of the mortgage are asked.

Bush Mfg., Hartford, Conn., manufacturing airplane, truck and tractor radiators, has purchased the property of the Ellison Construction Co. in that city, comprising a tract of three acres improved with a factory building, storage house and gasoline station. Continued growth of business in recent years has made the removal of the Bush company from its present location in the city necessary.

Moline Plow Co., recently organized by a creditor's committee, plans resumption of business at its Rock Island plant, the Universal Tractor Co., early in December. Two hundred former employees of the tractor branch will be placed at work. In order that its warehouse stock may be disposed of a new work started, the company, at a loss, will reduce the price of all farm machinery.

Quaker City Rubber Co. of Philadelphia, manufacturer of Quaker tires and tubes, reports that its factories have been busy the entire year. At the main offices of the company the demand for space for the officers and salesrooms has been so great that it has been necessary to erect a new building at 624 Market Street, Philadelphia, which will be occupied Nov. 1.

St. Louis Pump & Equipment Co., St. Louis, engineers and manufacturers of gasoline and oil handling units for filling stations, has acquired a location at Forest Park Boulevard and Spring Avenue, that city, and

will centralize its general offices and plants there, the new location providing facilities for largely increased production.

Massey-Harris Implement Co. will open a plant in Australia for the manufacture of tractors. The company produced \$6,000,000 worth of machinery for Australia last year. The new Australian tariff has closed the commonwealth to outsiders and it becomes necessary to set up a plant there in order to hold this trade.

White Motor Co. has increased its production schedule 20%, inventory for certain models of trucks having been reduced to such an extent that greater production was necessary. September sales of the company were 8% better than August, a month that was 10% better than July.

Mikesell Bros. Mfg. Co., which occupies the former plant of the Perfection Tire & Rubber Co. at Wabash, Ind., is working full force, the only local industry on such schedule. The company manufactures brake linings, fan belts and other automotive equipment.

Chevrolet Brothers Manufacturing Co., organized by Arthur and Louis Chevrolet, will soon occupy its own building, Louis Chevrolet has announced. The company will manufacture Frontenac cylinder heads and also will do machine repair work.

J. G. Riga & Sons Co., Springfield, Mass., handling automotive equipment, has opened its new building in that city constructed especially to suit the needs of the jobber. The company maintains branches in Pittsfield and Holyoke.

Goodyear sales for the first nine months of the year exceed those of the same period last year, during which the first six months sales were the greatest in the history of the company, according to President E. G. Wilmer.

Moon Motor Car Co. reports that September sales for this year were 33% greater than sales for the same month in 1920. Business was not spotty, the cotton situation aiding substantially in an increased demand in the South.

The Racine Rubber Co. of Racine, Wis., has removed its sales department to New York. The company is a subsidiary of the Ajax Rubber Co.

Charles H. Harris, Norwalk, Conn., has completed a factory in that city for the manufacture of high grade plate glass for automobiles.

Farmers Oppose Plan
for Trade Commission

WASHINGTON, Oct. 11—Proposals originating within the administration for the abolition of the Federal Trade Commission have provoked widespread comment. It is understood the plans call for closing up the affairs of this Federal agency before June 30, 1922, if possible. Members of the commission are entirely familiar with the arrangements.

It is understood to be the purpose of the administration to reorganize the commission with a view to consolidating it with the Department of Justice. Opposition to the proposal has arisen among the farm organizations and they have appealed to the "agricultural bloc" in the Senate to prevent it if possible. It is contended in some quarters that the commission has become a persecutor of business rather than an aid in rehabilitating industry.

METAL MARKETS

THE character of recent price changes in the steel market furnishes the key to the proper interpretation of whatever alteration quotations may undergo during the year's remainder. From all that can be learned about the sheet orders now on the books of producers the preponderating bulk was placed at the recent low level, and the \$5 a ton advance, ample notice of which was given to every possible buyer, merely served as a magnet to bring out business at the old figure. The tonnage of sheet orders placed at the advanced prices is so negligible a one that it furnishes very little succor to the mills. Undoubtedly a good many sheet consumers just came in under the wire with their orders before the advance went into effect, but some of the smaller producing interests appear not to have been unduly exacting as to the time limit for acceptance of orders at the old prices. This past record, together with the plentitude of prophecies of higher prices for this or that steel product, which market reporters encounter these days, permit of the conclusion that whatever predictions of price advances will be launched into market reports in the next three months will be in the nature of efforts to bring out business at the old prices. Moreover, there will be far more predictions of price advances than actual raising of price levels. In fact, there are still a few commodities in the finished steel list that will very likely come in for reductions as a more direct means of inducing buyers to place orders. As the application of the Eastern trunk line railroads for permission to reduce freight rates on iron ore by 28 per cent, which was made to the Interstate Commerce Commission, has been granted the price of iron in the Pittsburgh district should eventually be cheapened by about 75 cents a ton and in the Schuylkill valley district by about \$1.25. It remains to be seen whether reductions in freight rates, which are confidently looked for all along the line, will result in immediate savings to consumers or whether, for a time at least, the revenue which the railroads will forego will wander into producers' pockets. Eventually, of course, competition will adjust this problem.

Pig Iron.—Automotive foundries are buying in a routine way only. Additional furnaces are contemplating resumption and October production will very likely pass the million-ton mark. With the elimination of surplus offerings by steel mill furnaces the merchant market is becoming more and more steady.

Steel.—Demand for full-finished automobile sheets is easing off as the result of seasonably lessened production schedules of passenger car builders. The same condition holds true of the strip steel market, although the Buick Motor Co. has recently figured as a fairly large purchaser of cold-rolled strip steel. The market for alloy steels lags, but producers hope for broader demand from refinements in 1922 passenger car models.

Aluminum.—On the surface there appears to be but little change in the situation, German 98 to 99 per cent ingots having been offered in the last few days at as low as 17c., duty paid, and a tonnage of French metal being hawked around the market at a similar price level, provided the entire lot would be taken. These offerings, however, appear in the light of clearance sales.

Copper.—London's opinion of the recent advances in the copper market are of interest. That market ascribes the advance solely to manipulation. There is no question that consuming buying here has broadened.

MEN OF THE INDUSTRY

William M. Chamberlin has been appointed to the sales department of the Maxwell Motor Sales Corp. and Chalmers Motor Car Co. He will be concerned with the development of better merchandising methods. Chamberlin has been connected in various capacities with the Wright Mfg. Co., Detroit; Wilder Tannery, Waukegan, Ill.; Irving National Bank of New York, Detroit Lubricator Co., and Detroit Twist Drill Co. He was also president of the Chamberlin Co., a technical advertising agency.

J. A. Gelzer, Chicago, formerly associated with the Wagner Electric Mfg. Co., St. Louis, has been appointed sales manager of the Hoosier Clutch Co., Muncie, Ind. Gelzer is a university graduate in mechanical and electrical engineering and has been associated with the Wagner company for the past fifteen years, the last eight of which were spent in the automotive branch of the company's business as manager of sales in the western district.

J. H. Greer has been appointed manager of the Kansas City branch of the McGraw Tire & Rubber Co., succeeding W. S. Chambers, resigned. Greer has had 14 years' experience in the tire business. During this time he had served as branch manager for several prominent tire companies, among them being the United States for whom he functioned as branch manager at Kansas City.

Dr. Walter E. Boveri has arrived in New York to make a study of business conditions in this country. Boveri is a member of the Swiss electrical engineering firm of Brown, Boveri & Cie., which has important affiliations in many European countries, and which also controls Scintilla Société Anonyme of Soleure, Switzerland, and the Scintilla Magneto Co., Inc. of New York.

W. H. Richardson, manager of the Chicago branch of the Bearings Service Co., has been transferred to the managership of the New York branch. Frank J. Lemper will succeed him. Lemper is a mechanical engineer and a graduate of the University of Michigan. Previous to his present appointment he was connected with the Detroit branch of the company.

T. M. House, Spokane, has taken over the distribution of Rugles trucks for the Pacific Coast territory. He was formerly Western sales manager for the Republic Motor Truck Co. with jurisdiction over the Pacific Coast and later served as general manager for the company.

George H. Phelps, advertising manager of Dodge Brothers, has sailed for England aboard the *Aquitania*, accompanied by Russel Huff, chief engineer, to look over the company's British and continental business.

Victor Gauvreau, for the last four years chief engineer of the Pan Motor Co., St. Cloud, Minn., has joined the staff of the University of Minnesota as instructor of gas engines and machine design.

J. G. Anderson, president of the Anderson Motor Co., Rock Hill, S. C., has started on a six weeks' trip which will take him as far west as the coast visiting company dealers and distributors.

Herbert R. Hyman, for seven years advertising manager of the Cole Motor Car Co., Indianapolis, has become associated with Charles H. Fuller Co., advertising agency in Chicago.

J. Walter Drake, chairman of the foreign trade committee of the National Automobile Chamber of Commerce, has been elected a

director of the American Manufacturers' Export Association.

F. H. Dolbeer, formerly treasurer of the Willys-Overland Co., Toledo, has been made traveling sales manager of the Victor Talking Machine Co., with headquarters at Camden, N. J.

S. W. Reese, formerly representative of the Oldfield Tire Co. in the Kansas City district, will succeed H. T. Roseland as branch manager in that territory for the Star Rubber Co., Akron.

FINANCIAL NOTES

General Motors Corp. probably will make a better financial showing for the full year than was expected a few months ago. Definite figures for the third quarter have not been completed, but the fact that shipments were as large as in the second quarter, if not larger, indicates that the profits will approximate those of the June quarter. The company is getting constantly increasing benefits from its improved inventory position.

Durant Motors has been granted permission by the securities department of the Secretary of State's office of Illinois to resubmit its statement for filing, which, if filed, will carry with it the right to offer its securities in the State.

Black & Decker Mfg. Co., Towson Heights, Baltimore, builder of portable electric tools, has declared a dividend on outstanding preferred stock for the third quarter this year amounting to 2 per cent, or 8 per cent per annum.

Chevrolet Motor Co. has declared a dividend of 3 per cent on its capital stock, payable Nov. 2 to stock of record Oct. 15.

Service Motor Truck Co., Wabash, Ind., has redeemed \$137,850 worth of preferred stock.

Packard Sets Record
in Argentine Contest

BUENOS AIRES, Sept. 17 (By Mail) —The swiftest kilometer ever run by an automobile in South America was made by the winner of the kilometer championship of the Automovil Club Argentino, recently held here on the La Plata road and competed for by a field of 27 drivers. The championship was awarded to Alejandro Schoega, who drove a Packard car over the measured kilometer in 21.6 seconds or at the rate of 166-2/3 kilometers an hour. In this, he bettered by practically six seconds the time made in 1918 by Juan Bonamaison, who won the last kilometer championship held by the club. The rate in that race was 130.67 kilometers per hour.

Schoega's victory was in the unlimited class, in which he was pitted against six other cars of North American, French, German and Argentine manufacture. Other categories were of cars limited in cylinder displacement to three, four, five and six liters. In the various classes, victories were scored by the Sunbeam, Wolseley, Poto, Nash, Hudson and Cadillac, cars of the latter makes placing first in two races.

Earl Specifications
Differ from BriscoeProvide for Smaller Engine and
Longer Wheel Base on New
Product

JACKSON, Oct. 10—Closely following on the heels of the change in name of the Briscoe to the Earl comes the information that the new car, which will also bear the name of Earl, will be very much different from the Briscoe.

The engine is four-cylinder block cast, 3 7/16 x 5 1/4 in., a little smaller than the Briscoe. It has a three-bearing crankshaft, splash lubrication, and thermo-siphon cooling. A 10-in. Borg & Beck dry plate clutch will connect the engine with the three speed gearbox. The semi-floating rear axle, with spiral bevel gear and pinion, will be arranged for Hotchkiss drive. New Departure ball bearings will be used on the pinion shaft and Hyatt roller bearings in the differential and rear wheels; 14-in. brake drums are fitted on the rear wheels, and an emergency brake is mounted on the transmission.

The 7-in. frame has five cross members and semi-elliptic springs; 36 in. long in front, 56 in. in the rear. The steering gear is of the worm and gear type and a 17-in. steering wheel with horn button top is fitted. The car has 112-in. wheel-base; I-beam front axle with Timken roller bearings in front wheels, is used.

Artillery-type wood wheels with demountable rims are standard equipment, but wire wheels are provided at extra cost. Cord tires, 32 x 4, are standard equipment, straight side. An 18-gal. gasoline tank is mounted at the rear, with vacuum feed to carburetor. Color: touring car, Lake green, with black top, fenders and chassis. Genuine pebbled grain leather upholstery. Nickel-plated radiator shell, lamps, bumper and trimmings. Linoleum covered floor boards. Equipment includes electric side lights, Motometer, windshield wiper, tonneau foot rest, etc. Color: roadster, optional, with choice of upholstery; same equipment as touring car. Color: sedan and brougham, Ultramarine blue. Equipment includes cowl ventilator, sun visor, rear view mirror, running board step mats, interior dome light, heater and silver plated metal trimmings.

John N. Willys Buys
Estate Near Toledo

TOLEDO, Oct. 10—John N. Willys has purchased a 100-acre estate up the Maumee Valley from Toledo, a distance of about five miles. He plans to build a 30-room residence. It is expected this will mean that Willys plans to spend a large portion of his time each year in Toledo.

Willys recently sold to Arthur Bell, bond broker, Toledo, his city property, which was valued at \$1,000,000. The new up-river home is in a group of large estates.

Calendar

SHOWS

Nov. 14-19—Jersey City, Second Annual Automobile Show of Hudson County Automobile Trade Association. Fourth Regiment Armory.

Nov. 27-Dec. 3—New York, Automobile Salon, Hotel Commodore.

January—Chicago, Automobile Salon, Hotel Drake.

Jan. 7-13—New York, National Automobile Show, Madison Central Palace. Auspices of N.A.C.C.

Jan. 28-Feb. 2—Chicago, National Automobile Show, Coliseum. Auspices of N.A.C.C.

Feb. 6 to 11—Seventh National Tractor Show and Educational Exposition, Minnesota State Fair Grounds, Minneapolis.

Feb. 6 to 11—Winnipeg, Can., Automotive Equipment Show, Western Canadian Automotive Association.

Feb. 20 to 25—Louisville, Ky., Louisville Automobile Show, Auspices Louisville Automobile Dealers Association.

FOREIGN SHOWS

Oct. 5-16—Paris, France, Paris Motor Show, Grand Palais, Administration de l'Exposition Internationale de l'Automobile, 51, Rue Pergolèse, Paris.

Oct. 10-22—Olympia, England, Truck Show. Nov. 4-12—Car Show. Nov. 28-Dec. 3—Motorcycle Show.

Nov. 4-12—London, British Motor Show, Society Motor Mfrs. and Traders.

November 7-14—Paris, Seventh International Exposition of Aerial Locomotion in the Grand Palais of the Champs Elysees, Held by the Chambre Syndicale des Industries Aeronautiques.

Nov. 26-Dec. 3—Shanghai, China, Automobile Show.

March, 1922—Santiago, Chili, Annual Automobile Show.

May, 1922—Quito, Ecuador, Agricultural Exposition, celebrating Centenary of Ecuador. Automotive Section.

Sept. 1922—Rio de Janeiro, Brazil, Automobile exhibits in connection with the Brazilian Centenary Association Automobilista Brasileira.

CONVENTIONS

Oct. 12-14—Chicago, Twenty-eighth Annual Convention National Implement & Vehicle Ass'n.

Nov. 15-16—New York, Convention of Factory Service Managers, National Automobile Chamber of Commerce.

Dec. 6-8—Chicago, Second Annual Meeting of American Petroleum Institute.

Dec. 27-29—Chicago, American Society of Agricultural Engineers, Auditorium Hotel.

Jan. 17-20, 1922—Chicago, American Road Builders Association.

S. A. E. MEETINGS

Detroit, Oct. 21, Nov. 18, Dec. 23, Feb. 24, March 24, April 28, May 26.

New York, Jan. 10-13, 1922—Annual Meeting.

Seager Invention Sustained by Court

Webb Jay System Infringed, Opinion Says in Suit Brought Against Stewart-Warner

(Continued from page 737)

"All of the functions which are ascribed by the defendant to the Stewart-Warner Webb Jay system, over and above Seager and Harrington, are functions resulting solely from additions to, and not departures from the combination of Seager's and Harrington's claims.

"Insofar as the record shows, no one prior to Seager recognized the usability of the suction produced in the intake passageway of an internal combustion engine as a source of power. Certainly, no one prior to Seager in any way applied that power to lifting fuel from a low level tank to an elevated auxiliary reservoir, from which the carbureter might be supplied independently of the level of the fuel in the main storage tank.

"Seager may have failed to claim the broader concept of applying that suction power to every kind of work outside the intake passageway, but certainly the means claimed by him for raising the fuel to an elevated auxiliary reservoir, and then discharging it to the carbureter of the engine, was new and entitled to broad protection.

"I have been urged to resolve any doubts in favor of the defendant, because the plaintiff's device has never been sold to the automobile trade, and because of the enormous investment made by defendant in putting its device on the market. This plea would be important if I were in doubt as to the validity of Seager and Harrington. However disturbing defendant's plea in this behalf has been, I must still bear in mind that whatever the power and activity of the defendant may have been in the past, it has been shown not only that Seager's invention is applicable to automobiles, but also that the defendant's device is applicable to stationary engines.

"As early as 1914 Seager was brought to the attention of the defendant when the Patent Office cited Seager in anticipation of claims made in the then pending application of Webb Jay. The Seager interests then opened negotiations with the defendant,

which proved to be fruitless. At that time the defendant resolved all doubts in its favor. In that it was wrong."

Will Appeal

CHICAGO, Oct. 12—Stewart-Warner Speedometer Corp. will appeal from the decision handed down in the United States District Court by Judge Carpenter in the suit of Seager, Payton & Thomas against Stewart-Warner, alleging infringement of automobile engine vacuum gasoline feed patents obtained by James B. Seager and Norman T. Harrington. It is said that the Stewart-Warner corporation has sold approximately 5,000,000 vacuum systems at \$10 each. In the absence of C. B. Smith, president of Stewart-Warner, no other statement than that the decision would in no way interfere with the dealer organization could be secured.

According to T. T. Sullivan, vice-president of the corporation, the tanks will continue to be manufactured, pending an appeal, and in the event that the higher court should decide unfavorably a very slight change in the construction of the tank will be made.

Gold Plaques Given Seiberling Brothers

AKRON, Oct. 10—Officials and employees of the Goodyear Tire & Rubber Co., Ltd., of Toronto, Canada, have presented to Frank Seiberling, founder and former president of all Goodyear companies, and to his brother, C. W. Seiberling, handsome solid gold plaques bearing inscriptions of tribute and respect.

Set in frames of purple plush, the plaques which are about six inches square are handsomely emblazoned with the American and Canadian flags, the American eagle and Canadian beaver. The border is of Canadian maple leaves, handcarved in gold.

The presentation of the plaques was made on Frank Seiberling's birthday on Oct. 7, and on the eve of his return to the rubber industry as a magnate controlling and operating a potentially strong chain of small rubber companies.

Farmers Hold Back for Price Reductions

Further Cuts Necessary, N. I. V. A. Members Told, in Order to Induce Buying

CHICAGO, Oct. 12—Members of the National Implement & Vehicle Association who are attending the 28th convention of the organization here were told to-day by C. L. Glasgow, representing the National Federation of Implement & Vehicle Dealers Association that farmers will not buy machinery at present prices, which represent a reduction of only 15 to 20 per cent from the war level. He urged implement manufacturers to cut prices now and take their losses, thereby getting ready for 1922 business. If this is not done, he declared, 1922 will witness a heavy mortality among dealers. Glasgow asserted that the buyers' strike of the farmers is still on and attributed it to the manufacturers' failure to cut prices.

The attempt of implement makers last spring to increase prices 10 per cent was very unwise, Glasgow contended, because it antagonized farmers who have loaned machinery to each other this year rather than buy new. As a result, the warehouses of implement makers are filled with unsold implements. Only a reduction in price will start the farmers buying, he said.

GRANT HAS NEW TOURING BODY

CLEVELAND, Oct. 10—A new touring body is being fitted to the standard Grant chassis and the complete car is called the Grant Special, priced at \$1,285. The construction of the body is slightly altered from the current model, the running boards are redesigned and the fenders shaped somewhat differently. Otherwise the Special model is similar to the standard touring, which has recently had considerable special equipment added without increase of price.